

SOUTH FLORIDA WATER MANAGEMENT DISTRICT



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**South Florida Water Management District**

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**WRAC MEETING AGENDA ADDENDUM**

July 2, 2009

**Supporting documents for the following item have been added:**  
**Item #:5**

See supporting document: [rog Ph I WRAC 7 2 09.pdf](#)

# Reviving THE *River of grass*



## Water Resources Advisory Commission July 2, 2009 Phase I Planning Update

Temperince Morgan, River of Grass Project Liaison/Northern Everglades Program Implementation Manager  
[sfwmd.gov/riverofgrass](http://sfwmd.gov/riverofgrass)

# Presentation Outline



- Planning Process
- Relationships, Trends, Tradeoffs, Other Considerations
- Analysis of Phase I ROG Modeling Results
  - Everglades Ecology
  - Water Quality Performance
  - Aquifer Storage and Recover (ASR) Implementation Update
- Phase II Planning Transition
- Next Meeting/Future Meeting Topics

# Reviving THE *River of grass*



## Planning Process

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RESTORATION PLANNING

## Planning Process

### ■ Where We Have Been and Where We Are Headed

- ✓ Development of Vision and Goal Statements
- ✓ Development of Problems, Objectives, and Constraints
- ✓ Development of Tools (including modeling and maps)
- ✓ Development of Team Configurations
- ✓ Evaluation of Stakeholder Team Configurations (June 2<sup>nd</sup> and June 18<sup>th</sup> meetings)
- **Evaluation of Relationships and Developing Refined Concepts  
(we are here- July 1<sup>st</sup> and August 4<sup>th</sup>)**
- **Discuss next steps for Phase II Planning**

# Planning Process- Evaluating Relationships and Developing Refined Concepts

## ■ Discuss and Identify

- **Initial Findings/Areas of Agreement-** What has this analysis of configurations shown us? What have we learned?
- **Areas Requiring Further Evaluation/Additional Information-** What features show promise but require more detailed information or a greater understanding? For what issues is more data, detailed modeling, or additional discussion required?
- **Common Elements/Foundation Projects-** What features are fundamental/common to all plans? What features should we pursue in the near term while planning and other evaluation activities continue?
- **Next Steps for Phase II**

## Planning Process RESOPS Peer Review Workshop

- Held June 30<sup>th</sup>
- Technical Review Panel
  - Provide information and address panel questions on RESOPS computer model
  - Solicit experts opinions on use of the model for River of Grass Project
- Follow-up teleconference call will be held July 9
- [http://webboard.sfwmd.gov/default.asp?boardid=PRRESOPS\\_P1&action=0](http://webboard.sfwmd.gov/default.asp?boardid=PRRESOPS_P1&action=0)

# Reviving THE *River of grass*



## Relationships, Trends, Tradeoffs, Other Considerations

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# Analyses of Phase 1 River of Grass Modeling Results Objectives/Modeling Analyses Methodology

## ■ Objectives

- Additional analysis to analyze trends in performance
- Helps to derive conclusions from Phase 1 effort and identify areas for additional study in Phase 2.

## ■ Methodology

- Data extracted from RESOPS results (performance measures) and benefits evaluation (ecological summaries)
- Data was summarized in various forms to illustrate observed trends
- In some cases, sensitivity analysis was performed to further explore relationships or examine “what if” scenarios
- Effort focused on examining the overall information provided by ALL configurations, not on further optimizing individual scenarios

# Modeling Analyses Topics

1. Observed hydrologic trends in configurations
2. Hydrologic sensitivity to water quality considerations
3. Hydrologic sensitivity to differing ecologic or system objectives
  - Examination of robustness
  - Role of storage in supplementing low Lake Okeechobee stages
4. Hydrologic efficiency of storage features
  - Deep / Shallow storage evaporation losses



## Summary of Key Observations

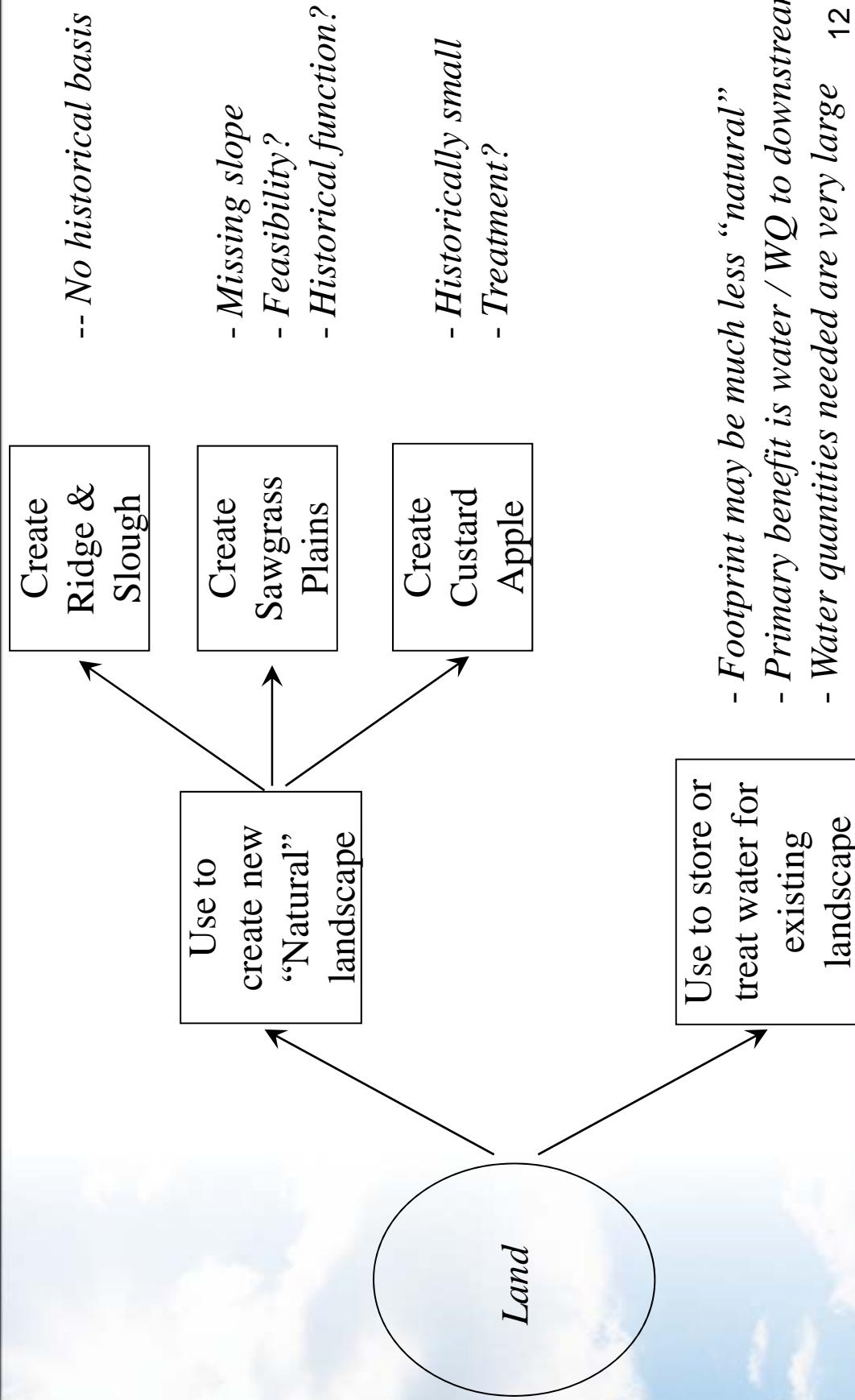
- Total storage volumes beyond the range of diminishing hydrologic improvement will likely be needed to improve ecological conditions
- Per given storage capacity, features that are maintained wet maximize hydrologic performance within the project footprint, but generally have less overall potential to achieve hydrologic objectives in the Everglades and estuaries
- It is possible for any particular configuration to achieve different hydrologic performance by modifying operational assumptions and/or changing assumed storage characteristics (e.g. wet vs. dry, shallow vs deep, etc...)
- Hydrologic impacts associated with adding needed treatment area to configurations in order to achieve water quality goals are small in most cases

## Summary of Key Observations (continued)

- Most configurations demonstrated high robustness (i.e. can be used to effectively meet multiple system objectives)
- In general, when trying to improve low stage conditions in the Lake, there is a corresponding reduction in flow to the Everglades and an increase in high Lake stage impacts and estuary events
- There is a potential need for a minimum amount of “North Storage”, which from a hydrologic perspective does not have to be sited north of the Lake, but must serve to help supplement low Lake stages
- Evapotranspiration volumes relative to total inflow volumes are markedly higher in shallow storage compared to deep storage (increased ET is water that does not reach the Everglades)

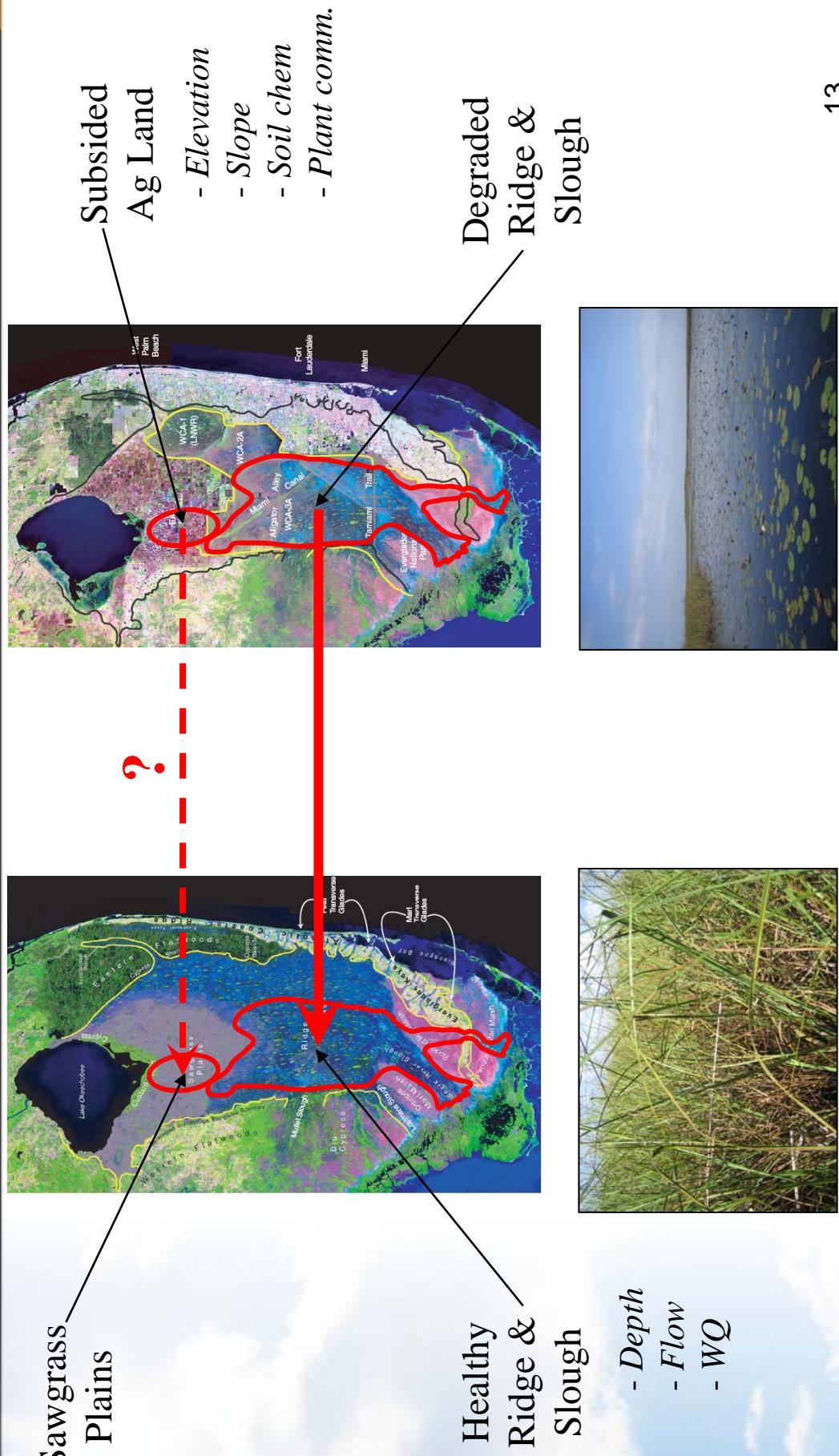
# Everglades Ecology

## New Spatial Extent or Improved Remaining Extent?



# New Spatial Extent or Improved Remaining Extent?

## RESTORATION PLANNING



# Water Quality Performance Overview

- As part of the Phase 1 Planning process, the goal was to provide feedback on potential TP removal performance
- Used a steady-state WQ modeling approach to work in concert with RESOPS
  - This Phase 1 Planning study will be followed by more detailed water quality analyses
- The water quality evaluation did not assess discharges into Lake Okeechobee or the estuaries, and did not extend into the Everglades
  - Water quality issues and recommended water quality projects for these watersheds are addressed in the Northern Everglades Lake Okeechobee Protection Plan (LOPPP) and River Watershed Protection Plans.
    - An update to the LOPPP will be prepared in 2010 and delivered to the legislature in early 2011.
    - During Phase 2 planning, Northern Everglades and ROG efforts will be coordinated and if necessary and/or appropriate, water quality evaluations related to discharges to the Lake or estuaries will be included in Phase 2 analysis

# Water Quality Performance – Summary

## ■ Relationships: TP removal is sensitive to

- Hydrologic targets
- TP concentrations in Lake Okeechobee deliveries
- Type of water resource feature
- Maintaining wet conditions

## ■ Tradeoffs:

- Degree of management vs. TP removal performance
  - Maintaining sufficient storage/treatment area to handle infrequent but high flows
- ## ■ Other considerations:
- Uncertainty

# Water Quality Performance – Next Steps

- Depending on the hydrologic targets (magnitude, inter-annual and intra-annual variability) an optimal combination of water resource features can be implemented
  - For example, to capture extreme high pulses, reservoir(s) followed by appropriately-sized STAs
- Phase II and subsequent planning-
  - Conduct dynamic water quality evaluation using daily time step
  - Further refine information related to water quality benefits of various feature types (e.g., flow-ways)
  - Refined evaluation of issues related to wet versus dry footprints and associated effects on water quality and hydrologic performance

# Aquifer Storage and Recovery (ASR) Implementation Update CERP ASR Pilot Projects

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## ■ Kissimmee River Pilot Project

- Excellent recovery efficiency during Cycle 1
- Already one month into Cycle 2



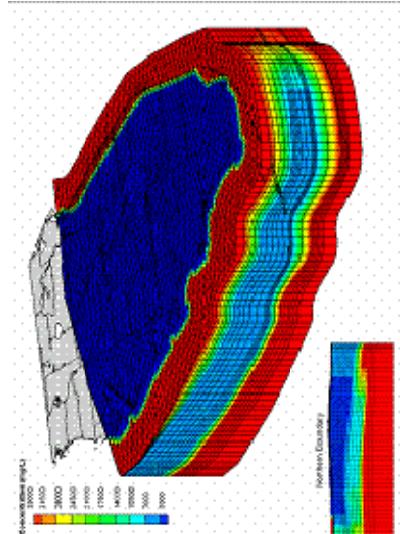
## ■ Hillsboro ASR Pilot Project

- Should begin cycle testing in early fall
  - delayed for nearly one year
- High capacity (10 mgd) well – probably will need fewer at Site 1

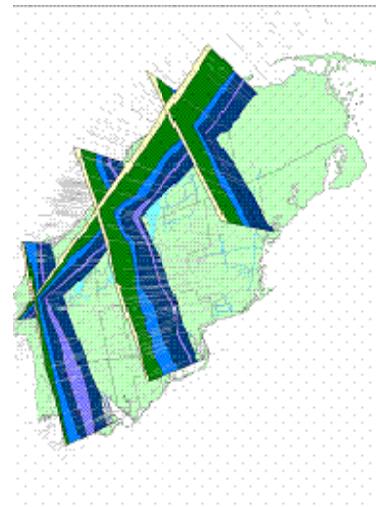


# CERP ASR Regional Study

## RESTORATION PLANNING



- To address regional issues beyond the scope of the pilot projects associated with full-scale ASR implementation
- Groundwater model and ecological risk assessment underway
- Results and simulations tied to pilot project cycle testing data
- Final report due in 2012



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## Phase II Planning Transition

Temperince Morgan, River of Grass Project Liaison/Northern Everglades Program Implementation Manager

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# Transitioning from Phase I to Phase II

## RESTORATION PLANNING

### ■ Phase I Planning

- Valuable screening level exercise
- Document findings (what seems to work, what trends and relationships do we see, what needs further analysis)
- Limitations of screening level model and unconstrained analysis
- Need more detailed modeling and evaluation effort to further refine these findings
- Transition into Phase II for Further Evaluation and Discussion
  - Utilize these findings as starting point for more detailed planning and analysis in Phase II
  - More detailed model and evaluation methodology
  - Consider system constraints
  - Consider phasing and common elements



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# Phase I Planning

- Developed a better understanding of value systems and perspectives of stakeholders
- Discussed and refined environmental restoration targets
- Used a water budget model (monthly time step) to test ideas and develop better understanding of relationships and tradeoffs between:
  - Northern storage and southern storage
  - Shallow storage and deep storage
  - Performance within different regions of the system

# Phase I Planning

- Utilized steady state model to evaluate water quality performance and determine additional treatment needs
- Developed preliminary cost estimates in order to improve understanding of cost drivers and relationships
- Document initial findings/common understandings
- Identify areas requiring further analysis or additional information
- Identify next steps which will allow us to transition from Phase I Planning into Phase II Planning

## Phase II Planning

### ■ Develop detailed Phase II Planning Strategy

- Further refine Phase I Findings
- Evaluate Areas Requiring Further Evaluation or Additional Information from Phase I
- Utilize results from Phase II modeling and evaluations to reassess or identify:
  - Ability to achieve restoration targets within constrained system
  - Likelihood of resolving/removing constraints; timeframes
  - Regional Robustness/System Wide Tradeoffs
  - Areas of Agreement/Disagreement
  - Proposed Features/Phasing Approach

# Initial Steps Phase II Planning

- Refine hydrologic and ecologic relationships and targets as appropriate
- Identify Phase II modeling toolbox and evaluation criteria
  - Complete model set-up
  - Finalize performance measure/evaluation methodology
- Identify Common Elements
  - Prioritize/decide which features can move first

# Initial Steps Phase II Planning

- Develop Plans of Study for areas requiring further evaluation/additional information, for example:
  - Dispersed Storage/FRESP
    - Hydraulics (e.g., Potential use of LILA or other site to study flow-way hydraulics, hydrologic and/or water quality performance)
    - Economic Study
  - Further refine Phase I Findings
    - Hydrologic and ecologic connections
    - Best balance of north storage and south storage
  - Determining the best mix of deep storage versus shallow storage
    - Wet footprints versus dry footprints- Use more detailed model to assess tradeoffs for water quality and hydrologic performance
    - Spatial extent of wetlands

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## Next Meeting/Future Meeting Topics

Temperince Morgan, River of Grass Project Liaison/Northern Everglades Program Implementation Manager

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## Next Meeting- Date and Location

### Next WRAC Issues Workshop

August 4, 2009

**South Florida Water Management District**  
**3301 Gun Club Road**  
**West Palm Beach, FL**  
**10:00 a.m. - 4:00 p.m.**

# Next Meeting- Meeting Topics

- Continue Discussion of Relationships, Trends, Tradeoffs, Other Considerations
- Discuss Initial Findings/Common Understandings
- Discuss Areas Requiring Further Evaluation or Additional Information



# Phase I Planning

## Future Meetings and Topics

### Future Meetings

(10:00 a.m. – 4:00 p.m.)

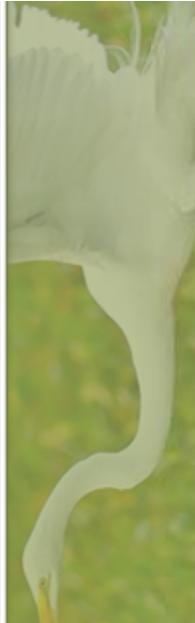
- August 20, SFWMD, West Palm Beach
- September 2, SFWMD, West Palm Beach

### Future Meeting Topics

- Next Steps for Phase II Planning

# Phase I Planning

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## Restoration Project Planning

On December 16, 2008, the South Florida Water Management District Governing Board voted to accept a contract with the United States Sugar Corporation to acquire more than 180,000 acres of agricultural land for Everglades restoration. This historic transaction provides water managers with the unprecedented opportunity to store and treat water on a scale never before envisioned for the benefit of America's Everglades, Lake Okeechobee and the St. Lucie and Caloosahatchee rivers and estuaries.

With full public involvement, the first phase of River of Grass restoration project planning is under way. Through series of Water Resources Advisory Commission Issues Workshops, the Phase 1 planning process will determine viable configurations for constructing a managed system of water storage and treatment to support ecosystem restoration efforts.

## RELATED MATERIALS

### RELATED

[Public Workshops: Dates, Agendas, Presentations, Minutes](#)[News, Fact Sheets, Public Information](#)[Reservoir Sizing and Operations Screening \(RESOPS\) Model](#)[Privacy Policy](#) | [Disclaimer](#) | [User Survey](#) | [Logout](#) | [Redline](#)

**Supporting documents for the following item have been added:**

**Item #:6**

See supporting document: [SFWMD Gov Bd Panel draft 06-12-09  
sfwmd doi comments.pdf](#)

restoration  
reforestation

WRAC Meeting

July 2, 2009

Programmatic  
Regulations  
Review

# Presentation Topics

- Background on Programmatic Regulations
- Concerns with existing regulations
- Emerging concepts for revising regulations

# WRDA 2000

## Comprehensive plan approved by Congress as a “framework”

- Individual “Project Implementation Reports” required for project approval and authorization
- Projects justified by environmental benefits to South Florida ecosystem
- No further economic justification required, if project is cost-effective
- Programmatic Regulations to be developed

# Programmatic Regulations

- ## *Establish Processes -*
- To ensure that the goals and purposes of the Plan are achieved
  - To ensure that new information, including information developed through the principles of adaptive management, is integrated into the implementation of the Plan
  - To ensure protection of the natural system, including establishment of interim goals by which restoration success of the Plan may be evaluated throughout implementation process

Wednesday,  
November 12, 2003



### Part II

#### Department of Defense

Department of the Army, Corps of  
Engineers

33 CFR Part 385  
Programmatic Regulations for the  
Comprehensive Everglades Restoration  
Plan, Final Rule

# Federal Register

# Current Programmatic Regulations

- Developed by interagency team with extensive input from stakeholders
- Utilized formal Federal rule-making process
- Promulgated by Secretary of the Army on November 12, 2003 with concurrence of Secretary of the Interior and the Governor of Florida
- Regulations became effective on December 12, 2003 as Title 33 Part 385 of Code of Federal Regulations

# Programmatic Regulations Review

- Review of programmatic regulations required by WRDA 2000 at least every five years
- Review process described in current programmatic regulations
- Proposed revisions must be undertaken through Federal rule-making process
  - Revised regulations will require concurrence of Secretary of the Interior and Governor before promulgation by the Secretary of the Army

# Public Scoping Process for Review

- Federal Register notice to initiate review on May 20
  - 90-day comment period
  - Public was invited to provide scoping comments on review effort
    - Issues concerning programmatic regulations
    - Items in the regulations that should be reviewed
    - Suggestions to improve the regulations
- Comments received from 9 individuals and 18 groups
  - 10 environmental groups co-signed one letter
- Summary of comments prepared

# Analysis of Public Comments

- Streamline process, particularly PIRs
- Effect of River of Grass acquisition
- Integrated Delivery Schedule/MISP
- Guidance Memoranda – complete? Incorporate?
- Next-added increment/project justification
- Interim Goals
- Assurances – identification of water and savings clause
- Incremental adaptive restoration/adaptive management
- Role of RECOVER
- Role of DOI
- Recreational needs
- Stakeholder involvement
- Treatment of State restoration projects

# So...What's Wrong with the Existing Regulations?

- PIR requirements burdensome
- NAI and justification of individual projects counter to an integrated system-wide (ecosystem) plan
- Assurances and savings clauses analyses are complex and difficult to understand
- Bottom line: Implementation process takes too long
- and the ecosystem continues to decline

# Key Provision from Existing Regulation

“The alternative plan to be selected should be the plan that maximizes net benefits, both monetary and non-monetary, on a system-wide basis, provided that this plan is justified on a next-added increment basis.”

# 2008 NAS Report to Congress

- The complex project planning and approval process has been a major cause of delays for CERP projects to date
- Deficiencies in CERP system-wide planning are affecting the delivery of natural system restoration benefits

“The next added increment is a benefits evaluation method that considers benefits only from the proposed and previously authorized projects....as currently implemented in the Everglades, it undermines system-wide planning.”



# The Bottom Line

Money spent vs. decisions not improved

“We’ve spent a lot of time and money to convince ourselves that we had the right plan to begin with”

# ProRegs Review Process

- Corps-SFWMD-DOT-FDEP team formed to review regulations and develop revisions
  - Team is considering concepts for revised regulations
  - Team will refine concepts for agency review
  - Opportunities for stakeholder engagement throughout process
- Revised rule will be a complete document, not set of amendments to existing regulation

# Emerging Concepts



Initial thinking and concepts developed by the team. Workability and acceptability of these concepts to be determined.

# Role of Plan and PIRs

- “The Plan” should be the central focus of CERP
  - Justification for the program
- PIRs have a specific role in implementing projects as defined in WRDA 2000:
  - Consistency with the Plan
  - Identify water to be reserved for the natural system
  - Analysis of cost-effectiveness and engineering feasibility
  - Compliance with NEPA
  - Compliance with water quality standards
  - Compliance with savings clause requirements

# Outline of Revised Regulation

- Subpart A: General Provisions
- Subpart B: Program Goals and Responsibilities
- Subpart C: Program Implementation
- Subpart D: Project Implementation

# Revised PIR Requirements

- Eliminate requirement to justify individual projects
- Habitat units (HUs) inappropriate metric for individual projects
- Should use appropriate hydrologic metrics to determine cost-effectiveness and engineering feasibility
- Project selection should be based on:
  - Hydrologic performance
  - Cost effectiveness
  - Engineering feasibility
  - Adaptive management considerations
  - Risk/uncertainty considerations

# Adaptive Management

- Adaptive management essential to success of program
- Incremental Adaptive Restoration (IAR) concept recommended by National Academies will be incorporated into the overall adaptive management program

# Sequencing

- Inclusion of non-CERP projects into program sequencing is needed for determining appropriate CERP project sequencing
  - Integrated Delivery Schedule
- Revised regulation will need to incorporate process
  - to periodically update project sequencing

# Guidance Memoranda

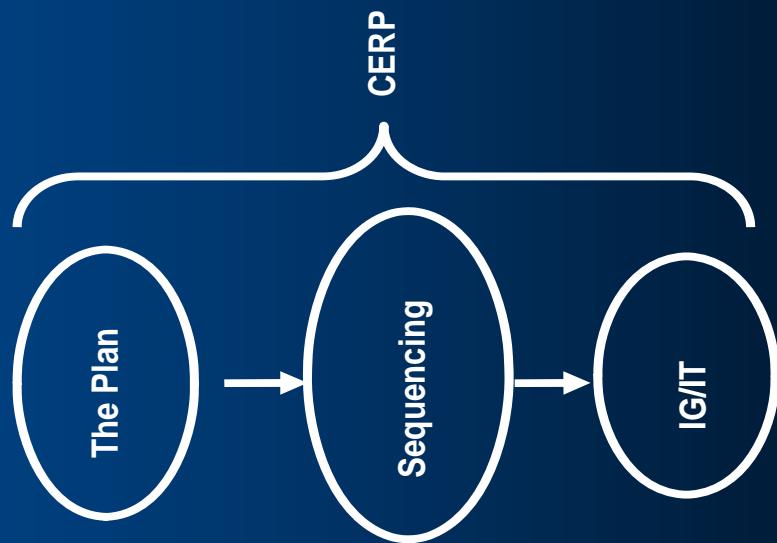
- Current regulations require 6 Guidance Memoranda with concurrence by Army, DOI, and State
  - Format and Content of PIRs
  - Formulation and Evaluation of Alternatives
  - Content of Operating Manuals
  - Assessment Activities of RECOVER
  - Identification of water
  - Identifying Elimination or Transfers of Existing Legal Sources of Water
- Team considering the following options:
  - Incorporate guidance as needed in revised regulations
  - Issue guidance approved by Program managers
  - Maintain more limited number of GMs for concurrence

# Interim Goals and Targets – Two Approaches

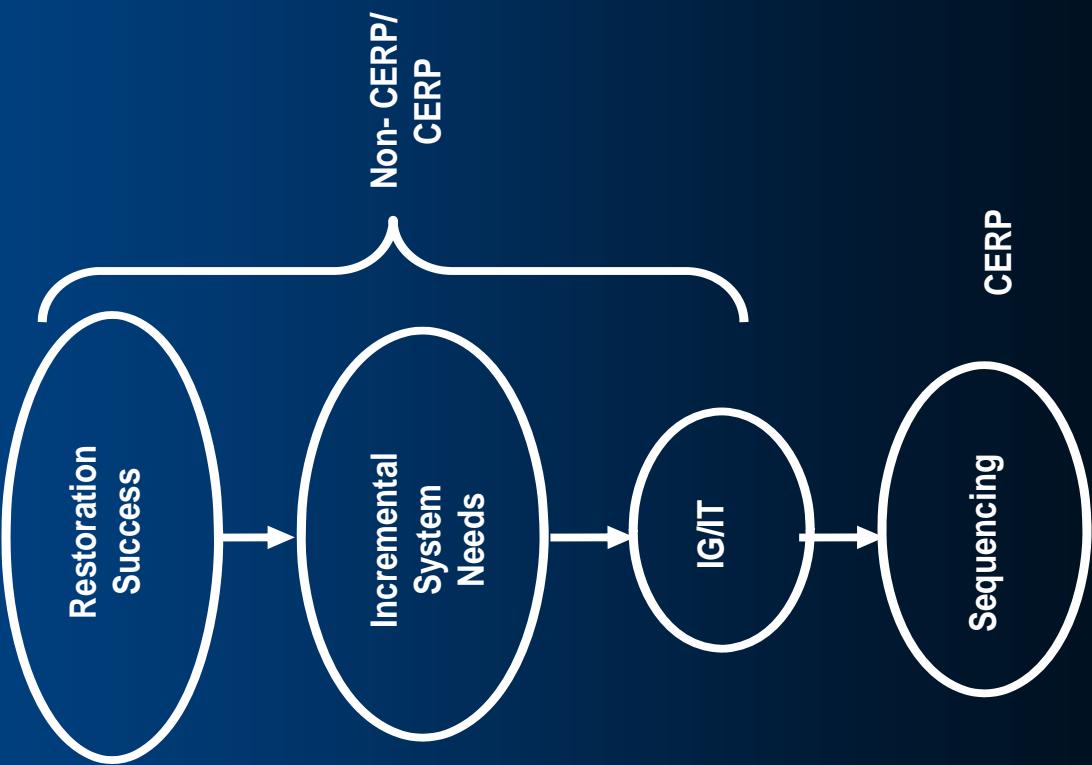
- Interim Goals required by WRDA
- Interim Goals and Targets contained in a separate agreement
- Two Approaches
  - Centers on CERP
  - Dependent on sequencing
- Alternative Approach
  - Independent of CERP
  - Requires agreement on “restoration success” and ecosystem priority needs
  - Sequencing driven by Interim Goals and Interim Targets
  - Restoration success and incremental needs to be developed at ecosystem level

# Approaches for Interim Goals and Targets

Current Approach



Alternative Approach



# CERP Updates

- Comprehensive Plan Modification Report is vehicle for developing and documenting recommended changes to the Plan
  - Submitted to Congress for approval
  - Update or supplement to programmatic EIS
- Eliminate requirement for periodic CERP updates
  - every five-years

# Important Note

While revising and simplifying the Programmatic Regulations is important, the regulations are not the sole reason for delays in CERP implementation

# Other Issues to be Considered

- Project Assurances
  - Identification of Water
  - Savings Clause
- RECOVER
- Consultation

# Schedule for Review

- Federal Register Notice of review: May 20, 2008
- Complete public scoping: August 22, 2008
- Complete initial draft of regulations: December 2009
- Initiate Federal rule-making process: January 2010
- Promulgate final revised rule: July 2010



# Questions?

**Supporting documents for the following item have been added:**

**Item #:8**

See supporting document: [Lk O Com Rpt 062409.pdf](#)

**SOUTH FLORIDA WATER MANAGEMENT DISTRICT (SFWMD)**  
**WATER RESOURCES ADVISORY COMMISSION (WRAC)**  
**LAKE OKEECHOBEE COMMITTEE MEETING**  
**Wednesday, June 24, 2009, SFWMD, Building B-1 Auditorium**  
**3301 Gun Club Road, West Palm Beach, FL 9:00 a.m.**

**MEETING SUMMARY**

**AGENDA ITEMS:**

- Welcome and Introductions
- Lakeside Ranch Stormwater Treatment Area Update
- Member Issues
- Water Conditions Summary
- Lake Okeechobee Status, Lake Ecology Update and Lake Okeechobee Burn Plan Revisions

**ACTION: Committee Members present made the following recommendations for Adaptive Protocols Issues Workshops:**

- Continue to follow the EIS (SFWMD allocates water for various uses in sub-band for base flows and environmental releases). SFWMD has responsibility for allocating water while in this sub-band and should be active in making recommendations.
- Try to maintain as much water in the lake as possible so it can be available in the dry season.
- Leave temporary forward pumps in place as long as possible.
- Begin with the 2003 Adaptive Protocols document to see how it can be modified to LORS, 2008. Address questions about how to operate within the different bands so there is predictability.
- Review Pages 77-78, Section 3, EIS, LORS, 2008 – Good flow chart on adaptive protocols.
- These only addressed environmental releases so need to develop water supply release protocols.
- Include USACE Water Managers in this process.
- Provide updated information on status of Herbert Hoover Dike repairs.
- Provide updated information on needs of water users in the Lake Okeechobee Service Area.

**FUTURE PRESENTATIONS:**

- Ten Mile Creek Reservoir Update – U.S. Army Corps of Engineers (USACE)
- Adaptive Protocols
- Northern Everglades Update (including Dispersed Alternative Water Storage)

**Item 1: Welcome: Ms. Melissa Meeker, Chair, WRAC Lake Okeechobee Committee:** Ms. Meeker welcomed everyone and introduced John Marshall and Marshall Foundation summer interns. She mentioned that handouts on

Dispersed Alternative Water Storage and Northern Everglades Update have been provided to members and the public and will be discussed in more detail at the September 30 meeting in Okeechobee.

**Item 2: Lakeside Ranch STA Update – Mark Long, SFWMD:**

**Discussion:**

- Estimated phosphorous load reduction? SFWMD: Estimate 25 metric tonnes/year load reduction.
- Does SFWMD own all the land and will the District be credited; and, will USACE share cost of construction?
- Chair: SFMWD was “fast-tracking” this one and we are committed to completing it. If we can get credit, we’ll do so. SFWMD: It is part of Master Agreement with USACE, which has not yet been signed.
- Brady Ranch STA is to the east. Have not yet begun design for that one.
- Trend in reduction of project cost estimates? SFWMD: Compartments B and C cost estimates were lower. Not sure we’ll get same reduction for pump station construction. Earth moving costs likely to be lower.
- Chair: Phase II funding for Lakeside Ranch STA is in the SFWMD 5-year budget plan. If we can get to it we will.
- Question about whether same cost reductions will occur for C-44 project.

**Item 3: Member Issues:**

- Miccosukee Tribe is near completion of construction on a project to re-hydrate 9,000 acres under agreement with SFWMD. Should be done by end of month.
- Agricultural interests in the EAA are hoping for a good wet season but still in the water shortage management zone. Need to begin the Adaptive Protocols WRAC Issues workshops. SFWMD: Working with senior staff on this. Had hoped to begin in July; not sure if the first meeting will be July or August.
- End of Water Year 2009 report on phosphorous discharges in the EAA: 68% reduction.
- Had recent meeting with FDEP, USACE, Palm Beach and Martin counties and SFWMD on North Palm Beach CERP project. Good results: have scheduled first Project Delivery Team meeting for next week.
- USDA Farm Bill, Wetlands Reserve Enhancement Program (WREP): have good news that will avoid need to do complex partnership agreement on grazing rights pilot projects. Rules not yet announced by USDA but progress is good.

**Item 4: Water Conditions Report – Susan Sylvester, SFWMD:**

**Discussion:**

- Member concerned about water in the Industrial Canal flowing back into Lake Okeechobee during high rainfall events. SFWMD: During the high rainfall events, the farmers turn on their pumps and if the lake level is low enough, water will gravity flow back to the lake.

- Trigger levels for releases by USACE? SFWMD: They are following new regulation schedule but have not discussed long term strategy for releases.
- Chair: Base flows begin at about 13' but they can discharge prior to that – do we compare long-term rainfall data and 50% projected info in our weekly calls? SFWMD: Yes. USACE is learning how to implement the new schedule but have not discussed long-term strategy. Question then is who is making the decision? They could choose to release water at 12' and then there would be releases when not needed.
- This is why we need to develop adaptive protocols. The Environmental Impact Statement (EIS) for the Lake Okeechobee regulation schedule, 2008 (LORS, 2008) states that while in the Beneficial Use Sub-Band (9.7' to 13') SFWMD allocates water to users. This may include releases for water supply and environmental needs, using SFWMD "Adaptive Protocols". The Adaptive Protocols don't exist for the LORS, 2008 Beneficial Use Sub-Band.
- Chair: Recommend this committee make suggestions about what should be addressed in the Adaptive Protocols Issues Workshops. SFWMD needs to 1). Continue to participate in the weekly phone conferences regarding discharges from the lake; and 2). Develop adaptive protocols for LORS, 2008.
- Committee Recommendations for Adaptive Protocols Issues Workshops: See Action, above.
- Chair: Sometimes the performance targets limit the scope of what we need to do. In the St. Lucie estuary for example, there are impacts on the near shore environment as well as on oysters. Fishermen would like to see less volume released in the pulses.
- SFWMD: We are monitoring responses of fish and wildlife.
- SFWMD: Important to complete the adaptive protocols for the LORS, 2008 EIS. Use work completed to date; don't recreate the wheel.
- Operation of S77 and S-308 – St. Lucie structures: SFWMD: USACE interpreting new schedule operations so have closed the S77 and S-308 at 11'. Allowing the St. Lucie Canal to come up to 14'. We have asked that they not release water to the St. Lucie Estuary and fortunately they have not. On the Caloosahatchee side, there is sufficient local basin runoff for environmental needs so no discharges have been made from Lake Okeechobee.
- SFWMD: We don't know what USACE will do when the lake reaches 12.6' – the elevation that would trigger releases. Problem is any releases would be on top of local basin runoff.
- Chair: The Kissimmee releases? SFWMD: Have a tailwater issue on the Kissimmee system which is being worked on.
- Any indication from USACE about how late in the season 12'6" is going to be the trigger number? SFWMD: That is a straight line in the LORS, 2008, so it will be the trigger. Last year releases were made above that line.
- Last year was a bad year for agriculture.

- **Public Comment:**
  - Lake looks very good in the 11' to 12' range, with apple snails appearing in some areas. Should be considered in discussion of adaptive protocols.
  - Modeling for apple snails was considered in the earlier version of the adaptive protocols. SFWMD: All resource areas were looked at.
- SFWMD: At present 6" on the Lake will bring it up 6" very quickly; and, any rainfall in the Kissimmee Basin will come to the lake because the Kissimmee floodplain is full now.
- USACE: Need to understand status of Herbert Hoover Dike rehabilitation.
- Chair: Do understand but asking USACE to be flexible and help us meet other needs as well.
- Agriculture lost battle on LORS, 2008. Modeling for operating lake at 1' lower than the previous schedule (WSE) showed increased frequency of water shortages and greater intensity. The LORS, 2008 was to be an interim schedule, but the modeling done for the EIS did not model releases while in the Beneficial Use Band. Now the rules for operation in the EIS are not being followed – a conflict with the compromise reached to enable lake to be operated at 1' lower. We were told there would be permanent forward pumps. Temporary pumps can only deliver 55% of the needs and then goes directly to Phase III; there are no other phases. EAA agriculture lost \$100 million last year due to drought impacts. We appreciate the opportunity to work to establish protocols that will work for the estuaries, the lake and water users.
- Recommended in past that SFWMD construct channels from outflow structures to water body when lake is at lower levels – would be cheaper than permanent pumps. SFWMD: There are problems with that approach.
- Biggest challenge is balancing all of the parts and meeting the demands.

**Item 5: Lake Okeechobee Status and Ecological Update – Paul McCormick and Chuck Hanlon, SFWMD:**

**Discussion:**

- Question about whether Snail kites eat both native and non-native apple snails? SFWMD: Initial research shows adults eat both. Harder for young to eat non-native snails.
- Re: Lake Okeechobee Controlled Burning Plans:
  - Division of Forestry rules require controlled burns be extinguished before dark on day of burn. Asking burn units be divided into smaller units.
  - Marshall Foundation has planted many trees on Torrey Island – can controlled burns be done to reduce understory fuel loads? SFWMD: Exotic vegetation is being treated; currently have no plans to burn that area. Before any burns are done, we will do a site evaluation.
  - Will burn plan be incorporated into a USACE EIS and will controlled burning be a shared responsibility with USACE and SFWMD?

SFWMD: Not sure, will get back with an answer. State of Florida owns submerged bottom of lake and is responsible for controlled burns.

- Chair: Need ideas to staff for agenda items.
- Need more information about plans for C-44. Need to make formal presentation to Martin County Commission.

**Next Meeting:** September 30, Okeechobee, FL

The meeting adjourned at 11:25 a.m.

**Supporting documents for the following item have been added:**

**Item #:10**

See supporting document: [BBCW July 2009 WRAC.pdf](#)

# Biscayne Bay Coastal Wetlands (BBCW) Project Update

Water Resources Advisory Commission (WRAC)

July 2, 2009

Dewey Worth, Director, Everglades Restoration  
Planning Project Management Division  
South Florida Water Management District

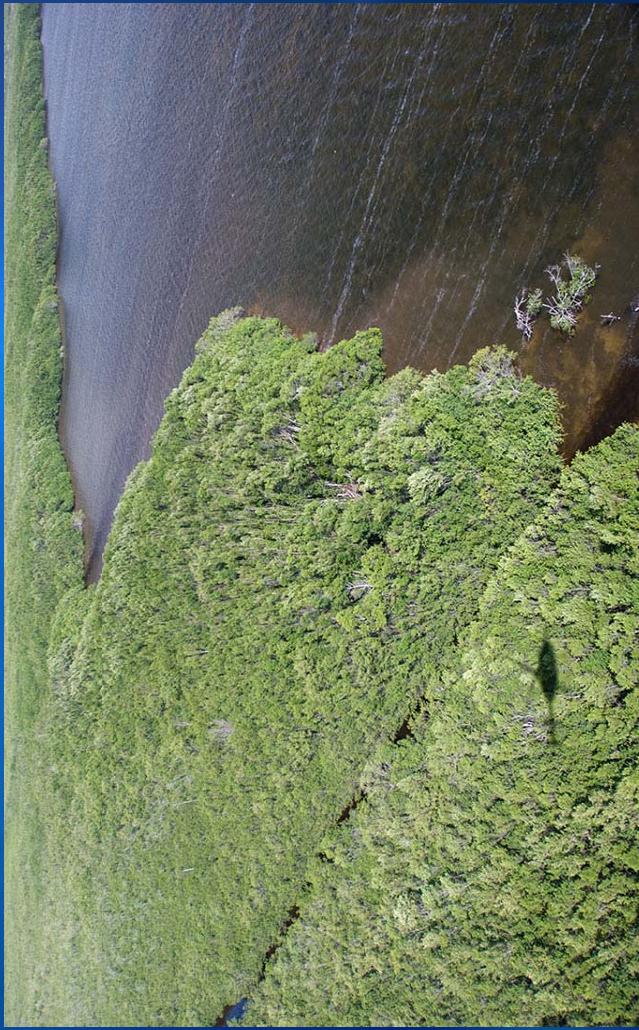


# Alt O Biscayne Bay Coastal Wetlands

- Recommends Phase 1 Implementation
- Draft PIR complete and circulating for internal review
- Release to public May-June 2009

# Project Constraints

- The project cannot adversely impact
  - the level of flood protection provided to existing agricultural and urban lands
  - existing legal users (or sources) of water
  - the level of flood protection provided to existing agricultural and urban lands

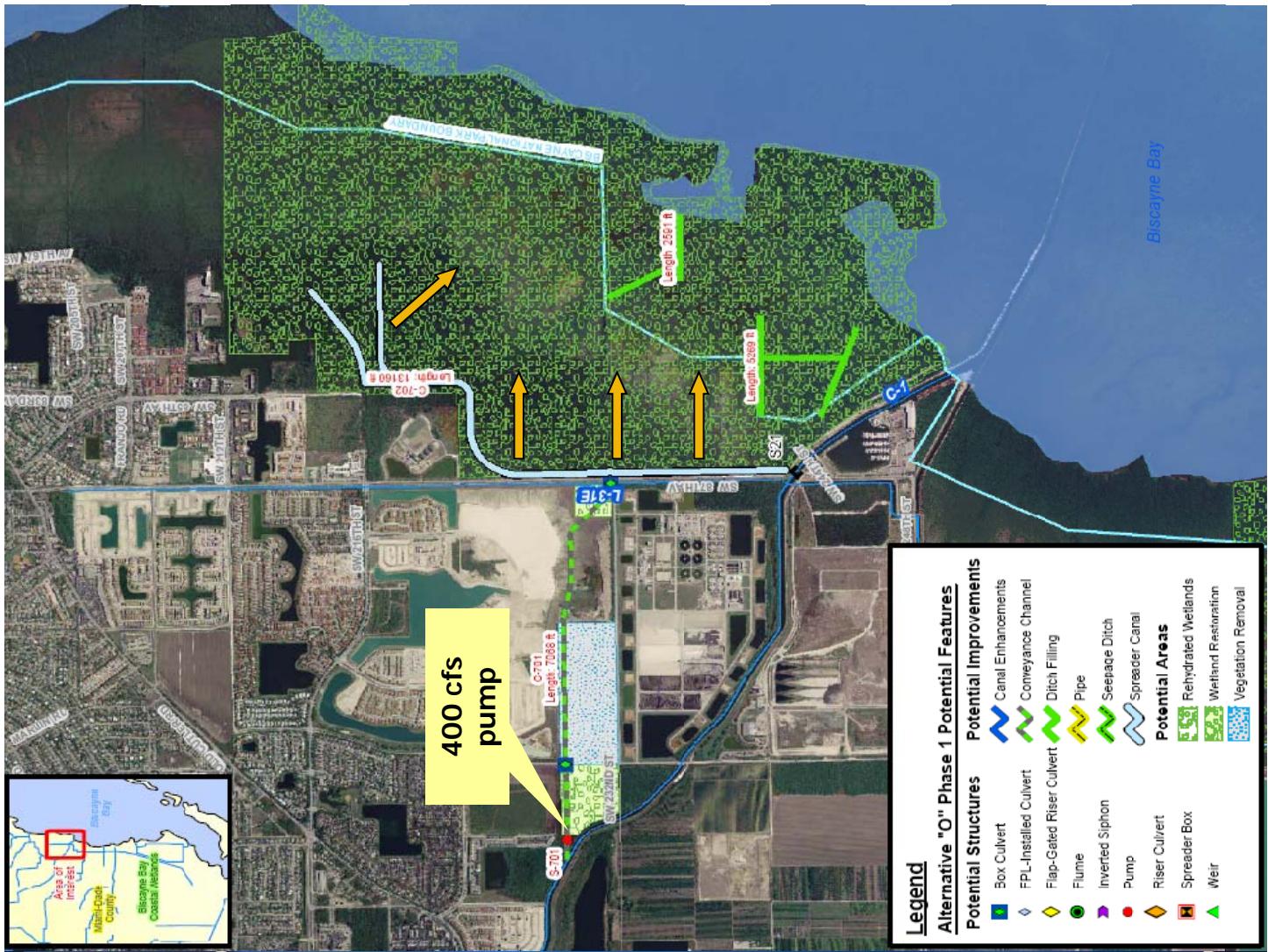


# Project Benefits - Phase 1

- The project is anticipated to divert 59% of the annual average discharge from four coastal structures (S-123, S-21, S-21A, S-20F) into freshwater and saltwater wetlands
  - predicted to reduce future nitrate loading to the bay by 50%
  - predicted to increase the acres of saltwater wetlands with salinity below 20 parts per thousand (ppt) from approximately 2,000 acres to 3,600
- The project is expected to re-hydrate 190 acres of freshwater wetlands
  - The project includes 500 acres of invasive exotic vegetation management
  - The project is predicted to result in a 10% increase (78 acres) in the amount of near-shore habitat meeting desired target salinity conditions

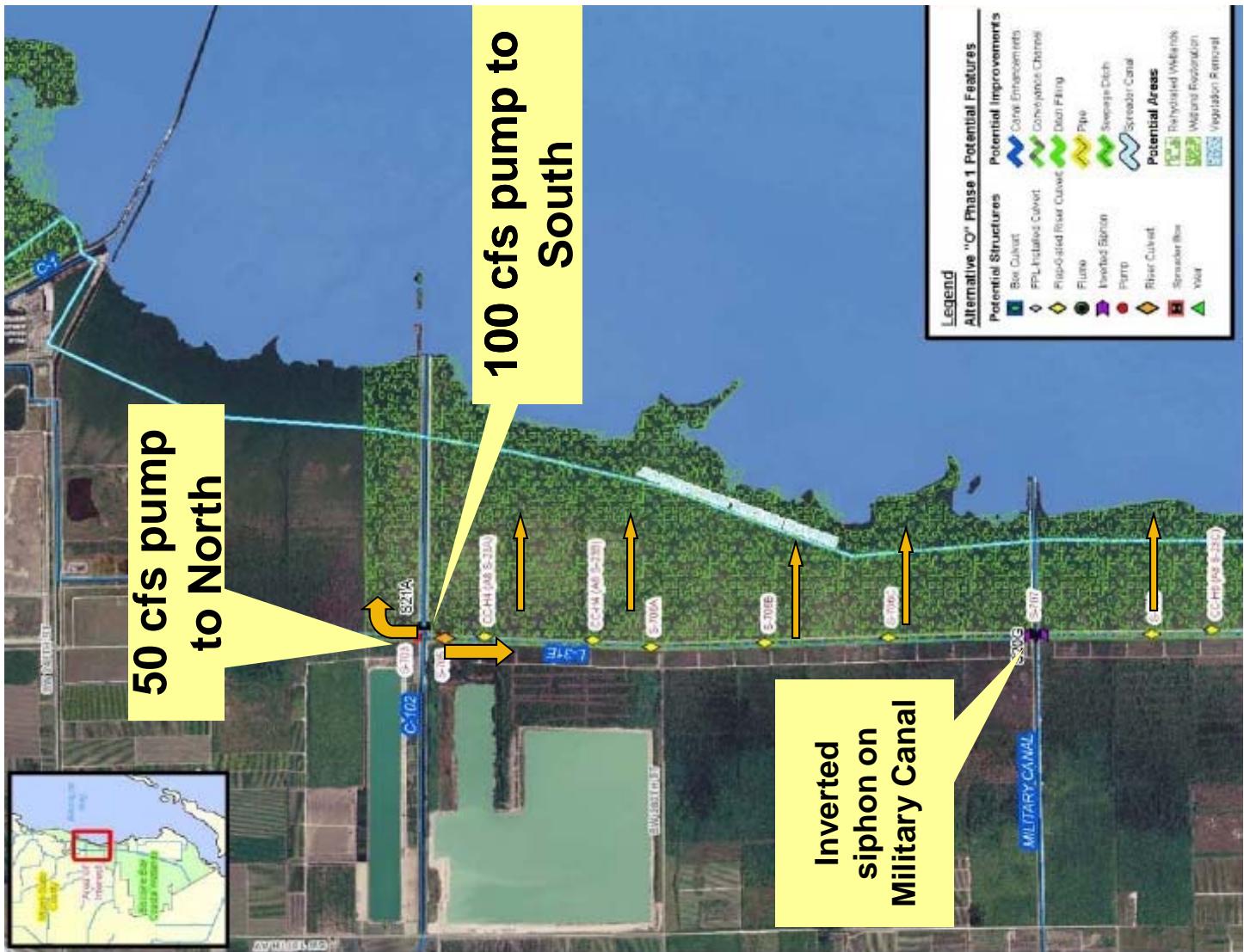


- Construct 500-foot extension of the C-100A Spur Canal through the Power's Addition Parcel to withdraw water from C-100A Spur Canal
- Construct 100 CFS Pump Station (S-700) on the Power's Addition Parcel to withdraw water from C-100A Spur Canal
- Install 538 linear feet (LF) of 60" pipe to the Cutler Drain and ultimately to coastal wetlands located within the Deering Estate



## Cutler Wetlands Project Features Alt O Phase 1

- Construct 400 CFS Pump Station (S-701) on the C-1 Canal
- Construct 6,900 LF of lined conveyance canal to deliver water from the pump station
- Install box culverts under SW 97 Ave, SW 87 Ave, and L-31E
- Construct 13,160 LF of spreader canal
- Plug 2,500 LF of remnant mosquito ditches



## L-31 E Flow way (North Portion) Project Features Alt O Phase 1

- Construct 50 CFS pump station (S-703) on L-31E (just north of C-102) with outlet spreader
- Construct 100 CFS pump station (S-705) on L-31E (just south of C-102) to discharge south to L-31E
- Install eight flap-gated culverts (S-23A, S-23B, S-706A, S-706B, S-706C, S-708, S-23C, & S-23D) to discharge from L-31 to saltwater wetlands east of L-31E

- Install inverted siphon at Military Canal to isolate it from L-31E

# L-31 E Flow way (South Portion) Project Features Alt O Phase 1

Construct 40 CFS pump station (S-709) to discharge water from C-103 north to L-31E

Construct 40 CFS pump station (S-711) and spreader canal (C-711) to deliver water from C-103 to freshwater wetlands south of C-103

Construct 40 CFS pump station (S-710) to deliver water from C-103 to freshwater wetlands south of C-103 (via spreader structure)

Install two flap-gated culverts (S-712A & 712B) to discharge from L-31 to saltwater wetlands east of L-31E



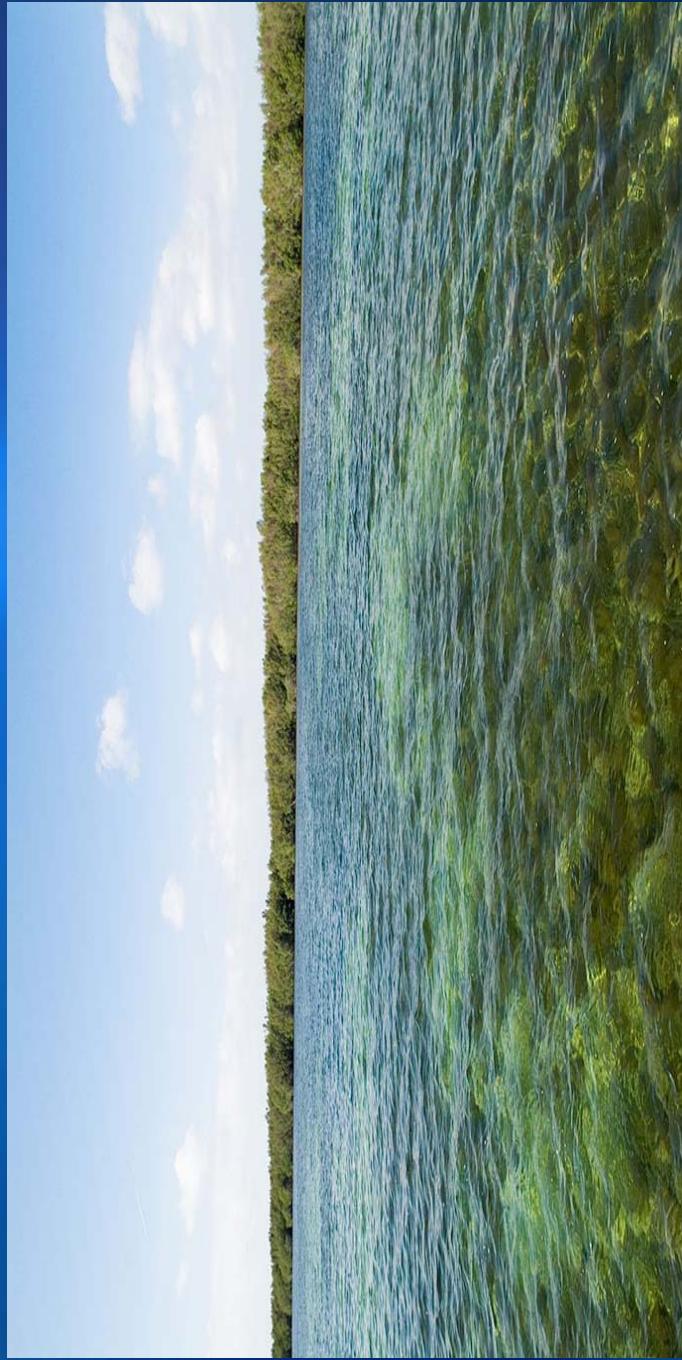
# First Phase Construction Cost

## Biscayne Bay Coastal Wetlands

Item	Total
Design/ Construction*	\$ 84,260,000
Real Estate	\$41,560,000
<b>Total Cost</b>	<b>\$125,820,000</b>

# Anticipated Phase 1 Construction (Subject to Funding)

- L-31 E Culvert Component
  - Fall 2009
- Cutler Wetlands/Deering Estate
  - May/June 2010



# CERP Project Monitoring

- Regional System Monitoring – RECOVER
- Project Level Monitoring – PIR
- Monitoring Plan Constraints
  - BBCW first of PIRs to recommend specifics
    - Current monitoring plan is limited to five years, but some recommendations exceed this limit
    - Modified by WRDA 2007 to a 10-year limit, but policy not yet adopted
  - Monitoring to continue until restoration targets are achieved
    - Unrealistic requirement; targets typically set high
    - Exceeds USACE policy
  - Overall Funding Cap – What is necessary vs. nice to have
    - Must be linked to baseline monitoring (pre-construction)

# BBCW Monitoring Plan Components

## ■ Estuarine Monitoring

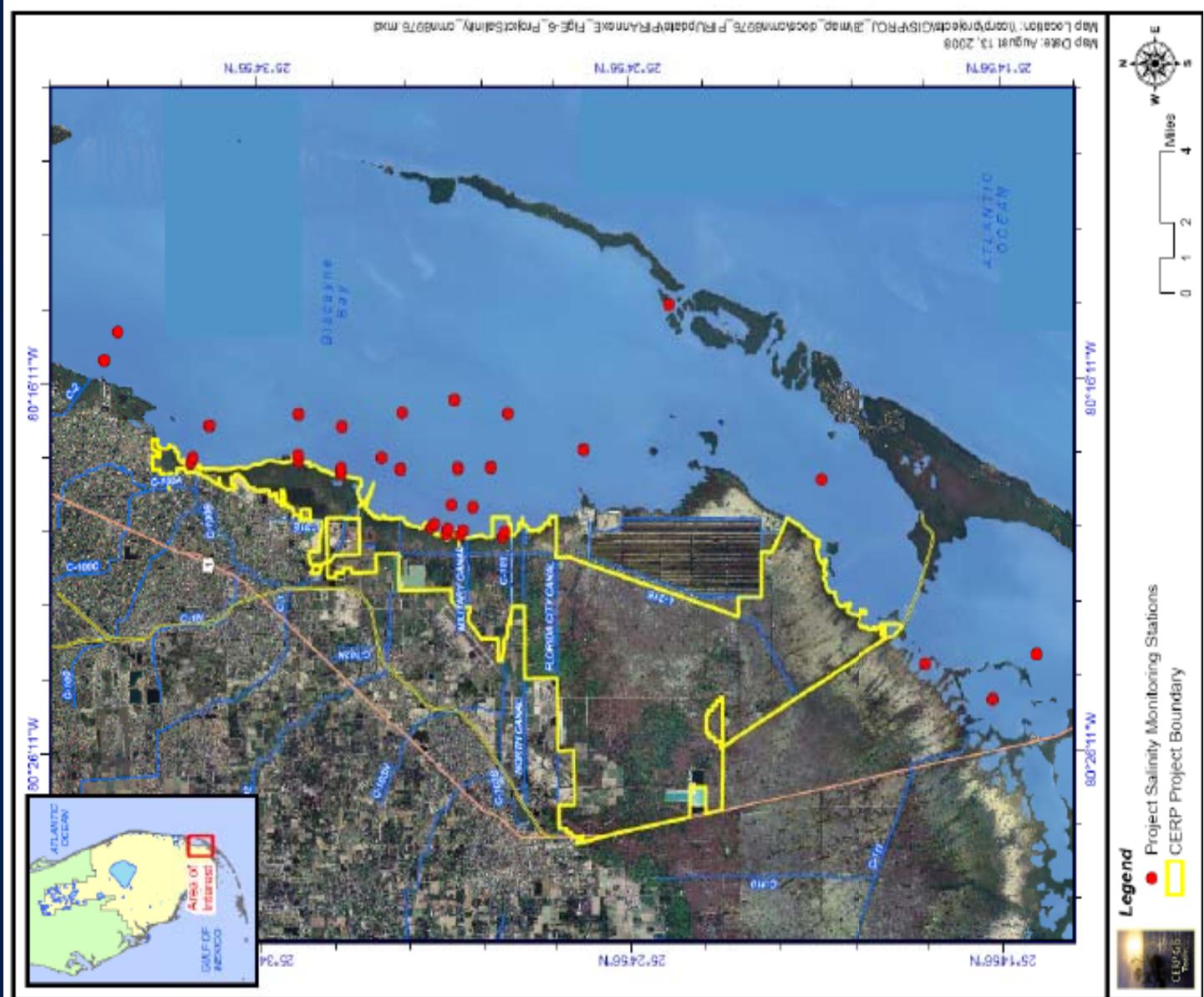
- Oysters as indicators of nearshore estuarine conditions
- Submerged aquatic vegetation, including seagrasses
- Fish
- Nearshore salinity

## ■ Freshwater Wetlands Monitoring

- Wetland stage
- Wetland vegetation
- Wetland algae

**\$914K for  
five years**

# Salinity Monitoring Stations



# Seagrass and Benthic Monitoring Sites



# Adaptive Management Recommendations in PIR

- Improving habitat conditions
  - Redistribution of water for oyster disease control, improved seagrass growth, and fish habitat
  - Fire management for exotic and woody species control
- Improve operations to achieve restoration objectives
  - Evaluate and modify operations over time to enhance project performance
- Overall Funding - \$5 million during 15-year period



## L-31E Culvert Installation Sites

Miami-Dade DERM  
Water Quality  
Monitoring Stations

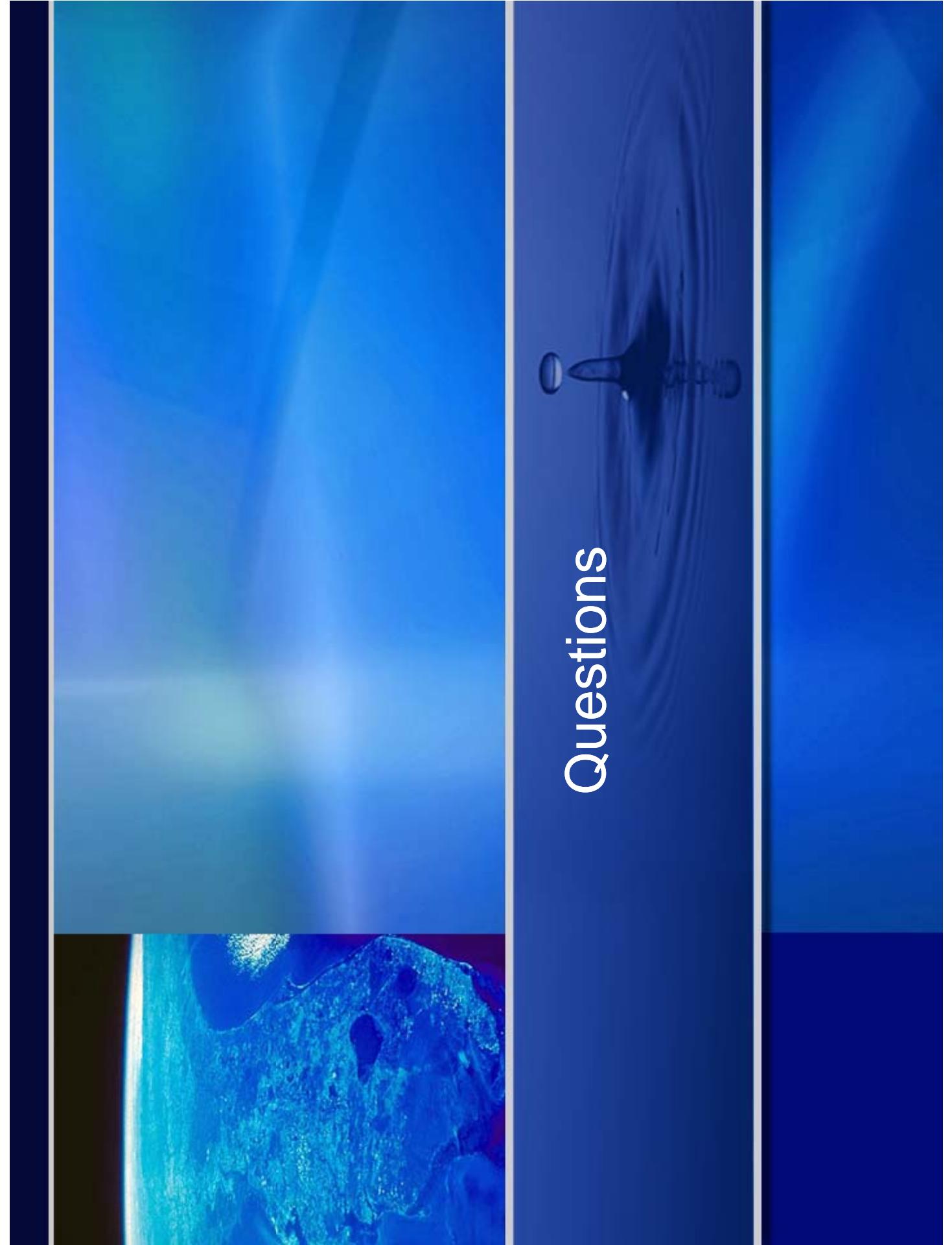


New Culvert Sites

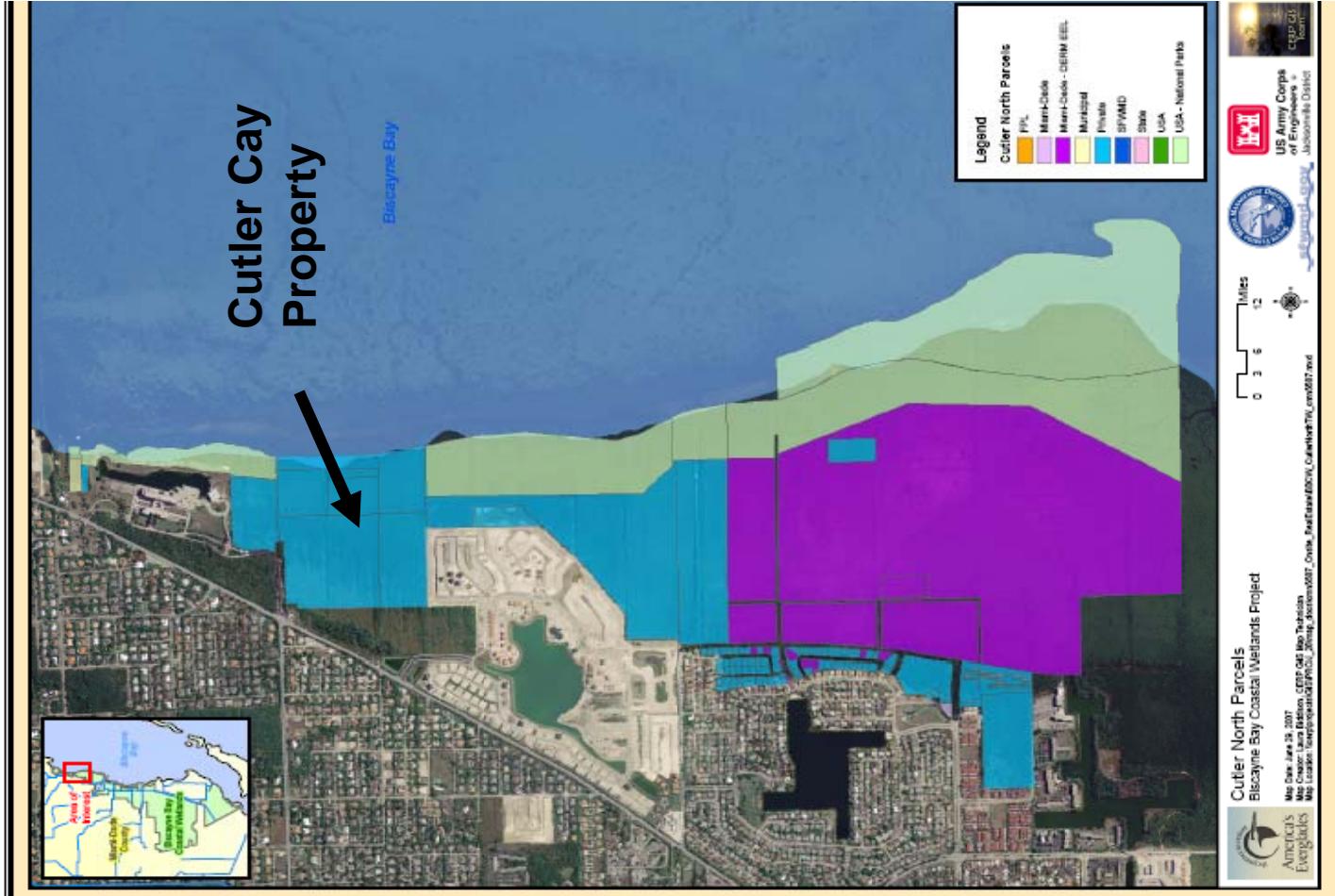
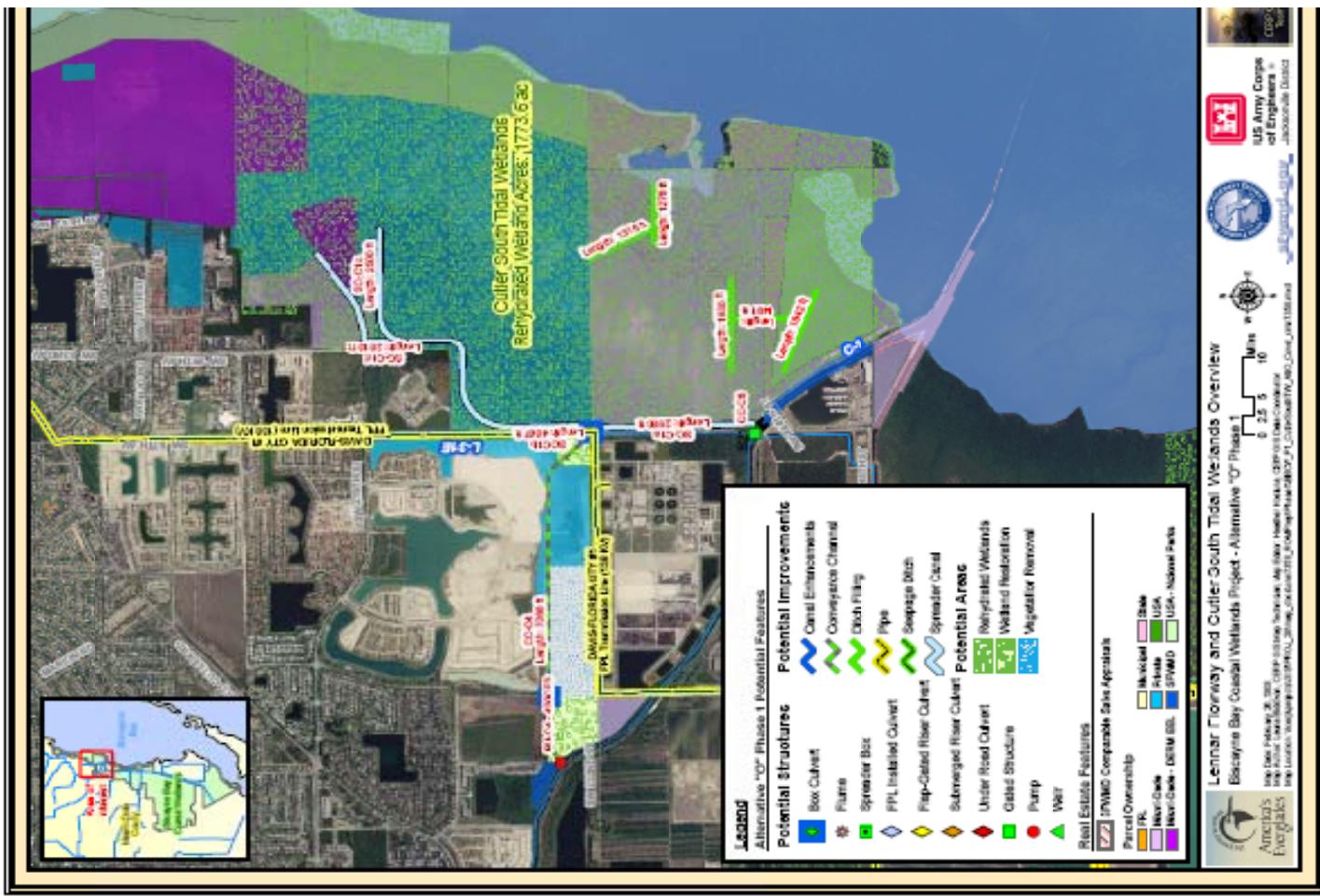


## Schedule to Record of Decision

- Draft PIR to Headquarters for review      June 24, 2009
- Headquarters policy review comments      Aug. 18, 2009
- Publish Draft PIR in Federal Register      Sep. 10, 2009
- Draft Final PIR      Mar. 8, 2010
- Civil Works Review Board      May 27, 2010
- Publish Final PIR in Federal Register      June 28, 2010
- Record of Decision      July 28, 2010



## Questions



**Supporting documents for the following item have been added:**

**Item #:12**

See supporting document: [WRAC St L W Res bmills blewis 7-3-09 final.pdf](#)

# North Fork of St Lucie River Water Reservation Rule Development

WRAC

Beth Lewis, SFWMD

Brenda Mills, SFWMD

July 2, 2009



[sfwmd.gov](http://sfwmd.gov)

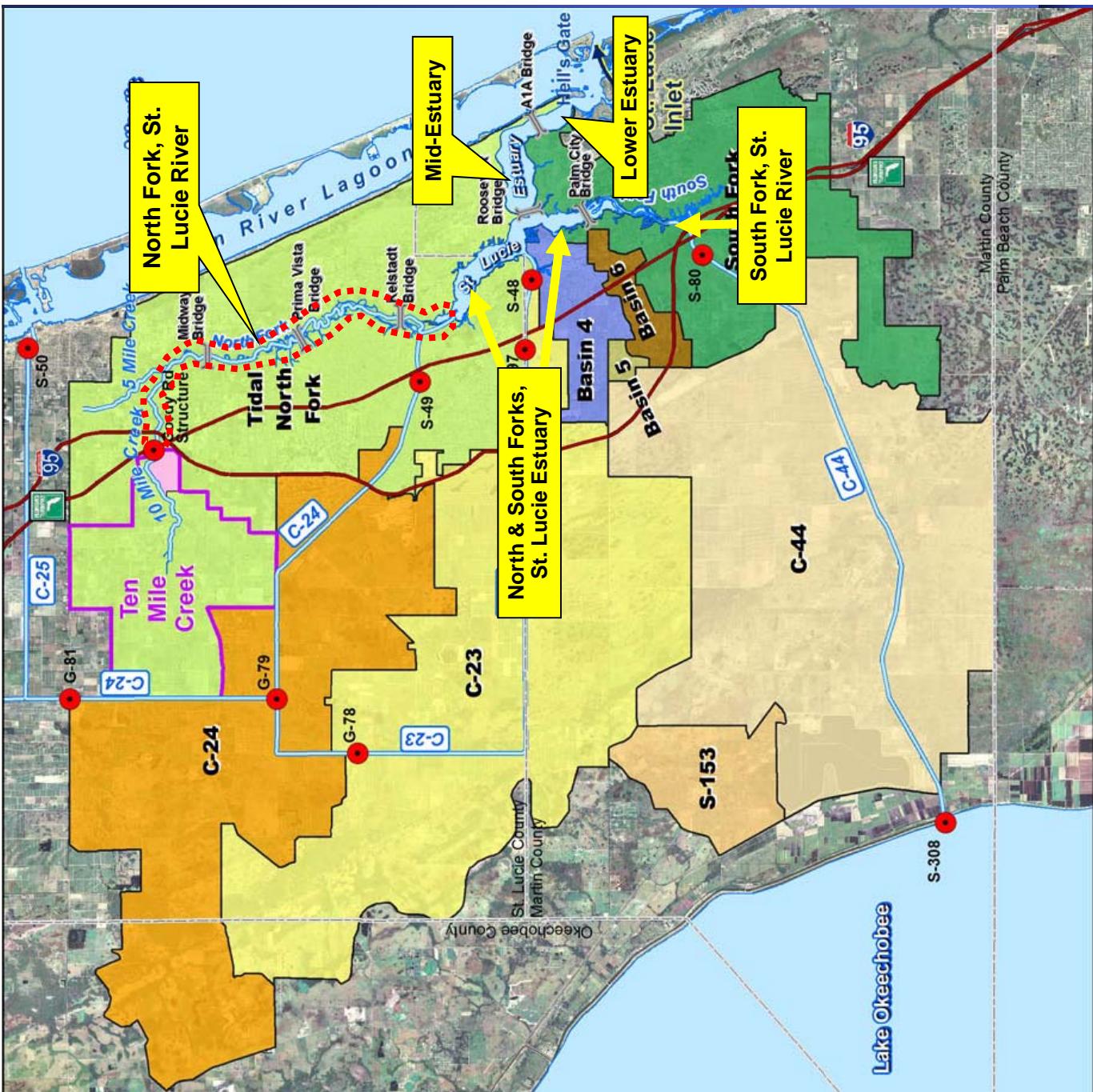
# Presentation Overview

- Why and What are Water Reservations?
- Reservation for North Fork of St Lucie River
- Scientific Peer Review



[sfwmmd.gov](http://sfwmmd.gov)

## St. Lucie Estuary Watershed



# St. Lucie Estuary Watershed Map

Major Basins  
and Ecologic  
Compartments

# Why Protect the Water?

- Water made available by the Project (CERP) for the natural system is required to be protected by Section 601(h) of the 2000 Water Resources Development Act (WRDA)
  - State required to protect water for natural system using its reservation or allocation authority
  - WRDA 2000 requires the reservation or allocation be complete prior to signing a Project Partnership Agreement to receive federal funding for Project construction and operation

# What is a water reservation?

- A water reservation is a legal mechanism to set aside water for the protection of fish and wildlife or the public health and safety
- Authority: F.S. 373.223(4)

# What is a water reservation?

- “The Governing Board or the department, by regulation, may reserve from use by permit applicants, water in such locations and quantities, and for such seasons of the year, as in its judgment may be required for the protection of fish and wildlife or the public health and safety.
- Such reservations shall be subject to periodic review and revision in the light of changed conditions.
- However, all presently existing legal uses of water shall be protected so long as such use is not contrary to the public interest.” S. 373.223(4), F/a. Stat.

# Department of Environmental Protection Rule F.A.C. 62-40.474

- Focus: Guidance for programmatic consistency
- Under what circumstance can a reservation be used?
  - Aid in restoration of natural systems which provide fish and wildlife habitat
  - Protect fish and wildlife within an Outstanding Florida Water or an Aquatic Preserve
- Periodic review and revision of reservation if needed
  - Location, quantity, timing and distribution to be clearly identified to the extent practical
- Prospective adoption allowed
  - Peer review of all scientific or technical data

# What does a reservation rule do?

- Prevents new uses from accessing reserved water



# What a reservation rule doesn't do

- Establish an operating regime by rule
- Drought proof the natural system
- Ensure the fish and wildlife goals of the project are achieved



# What's Next for Water Reservation Rule

- Rule Development workshops: April through September 2009

[sfwmd.gov](http://sfwmd.gov)

# Presentation Overview



- Why and What are water reservations?
- Reservation for North Fork of St Lucie River
- Scientific Peer Review

[sfwmrd.gov](http://sfwmrd.gov)

# Technical Approach: Key Assumptions

- *Technical Document to Support a Water Reservation Rule for the North Fork of the St. Lucie River, May 2009*
- Based on implementation of CERP - Indian River Lagoon -South Project described in the project implementation report (2004) as authorized by Congress
- Focus on civil works features
  - C-23/24 Reservoirs and STAs
  - C-44 Reservoir and STAs
  - C-25 Reservoir
  - Diversions to North Fork and C-44

# Key Assumptions, con't

- Appendix J of project implementation report (PIR) identified water delivered to the North Fork, in the dry season, to be reserved
- PIR did not identify water to be reserved for Mid-Estuary or South Fork
- Unlike PIR, water not identified for stormwater treatment areas (STAs)
- Reservation is based on protecting fish and wildlife located within the North Fork of St Lucie River during the dry season

# Key Assumptions, cont

- The IRL-South Project does not address releases from Lake Okeechobee. The proposed reservoirs and STAs capture, store, attenuate and redistribute surface water runoff from the watershed
- New scientific information and models have been developed since completion of the PIR. These data better characterize hydrology and salinity conditions within the North Fork
- Existing land uses, demands and operations similar to 2050 Future without Project conditions in terms of surface water hydrology

# Resource-based Approach

## 5 Basic Steps

1. Identify key ecological compartments sensitive to a water reservation
2. Identify fish & wildlife resources or habitat to be protected (Valued Ecosystem Component or VEC)
3. Identify performance measures and flow targets to protect the VEC
4. Quantify the water made available by the IRL-South Project
5. Identify the quantity of water to be reserved to protect fish and wildlife

[sfwmrd.gov](http://sfwmrd.gov)

# Step 1: Identify Key Ecological Compartments Sensitive to a Water Reservation

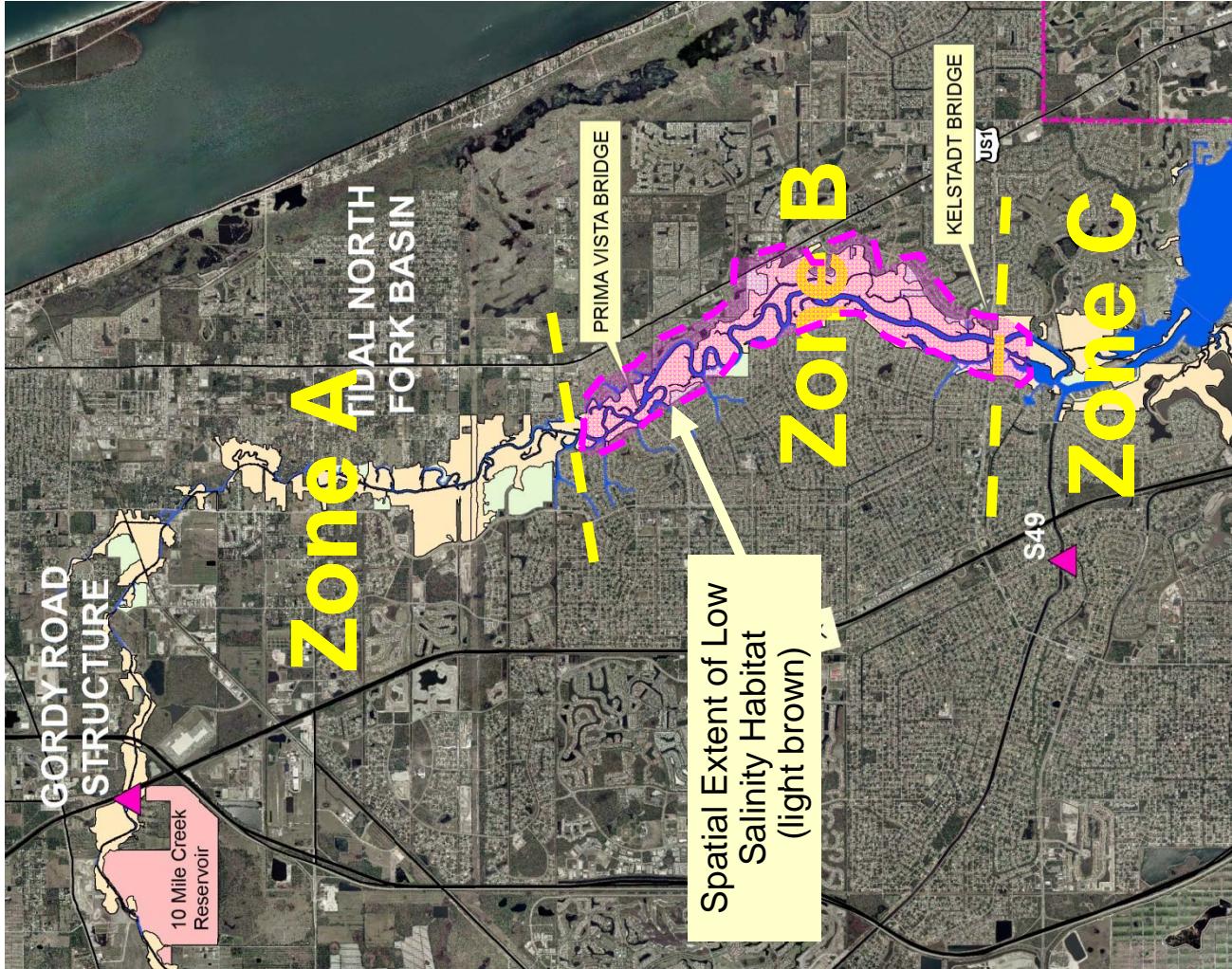
## Ecological Compartments Considered:

- Mid-Estuary – The PIR addressed the issue of damaging high volume flows and impacts to oysters and other estuarine biota within the mid-estuary
- South Fork, St. Lucie River – Not significantly affected by IRL-South Project features
- North Fork, St. Lucie River – Contains 17 linear miles of low salinity habitat, potentially important as a nursery area for estuarine and marine organisms. The North Fork was considered to be (a) the most sensitive area to low flow conditions and (b) the area mostly affected by future project inflows

## **Step 2: Identify Fish & Wildlife Resources (Habitat) to be Protected**

- District used a combination of the Valued Ecosystem (VEC) approach (USEPA 1987) and the Habitat overlap Concept (Browder and Moore 1981)
- The VEC for the North Fork is the **Low Salinity Zone**

# Area for establishing Low Salinity Conditions within the North Fork of St. Lucie River



## **Step 3: Identify Performance Measure and flow targets to protect the VEC**

- Maintaining a dynamic distribution of the 1 ppt isohaline between the **Prima Vista and Kelstadt bridges** during the dry season is the (salinity) performance measure for the North Fork of the St. Lucie River
- Equates to a mean monthly flow rate of **130 cfs**
- This represents the proposed flow target for the North Fork of the St. Lucie River

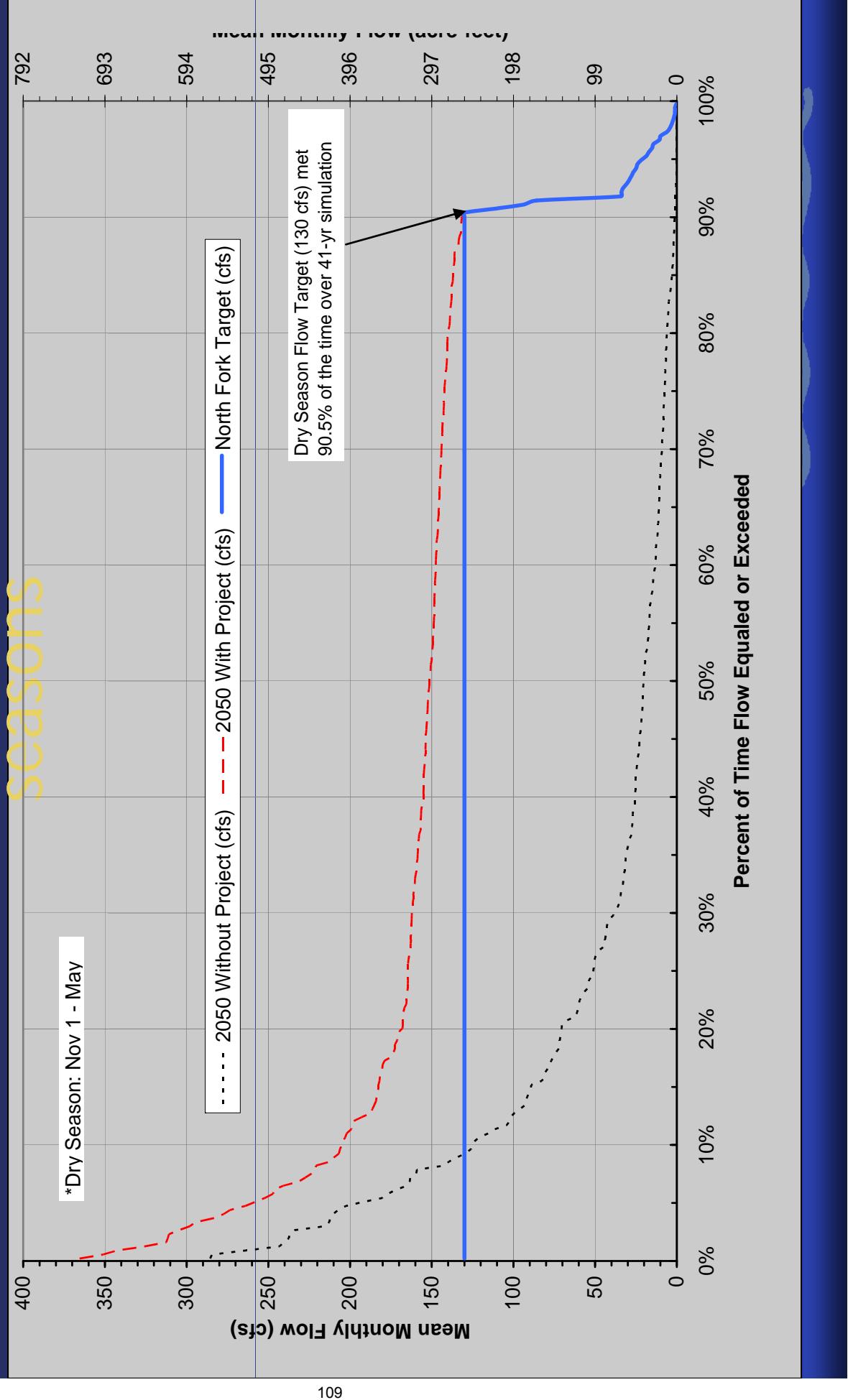
## Step 4: Quantify Water Made Available By Project

- To determine the volume of water made available by the project, applied an integrated modeling framework:
  - St. Lucie Estuary Watershed (**WaSh**) model
  - Reservoir Optimization (**OPTI6**) model
  - **CH3D** hydrodynamic model
- Products: 41-year time series of **daily flows**
  - 2050 Future without Project Condition
  - 2050 Future with Project Condition

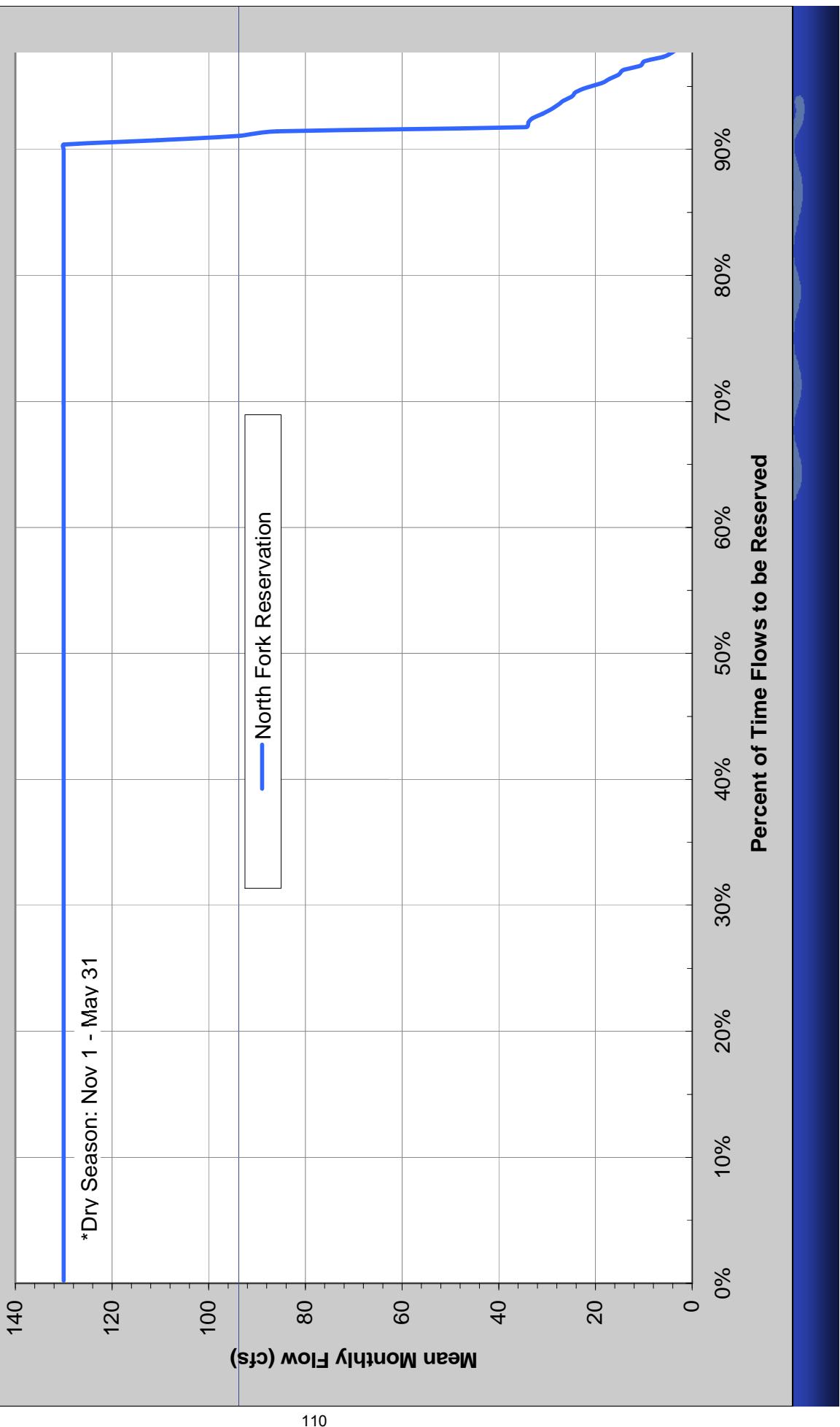
## Step 5: Quantify the Volume of Water to be Reserved

- Convert 2050 Future with Project and 2050 Future without Project time series into **mean monthly flow** data and presented as a Volume Probability Curve
- On the same graph, plot the **North Fork Flow target** (dry season mean monthly flow of 130 cfs) as a Volume Probability Curve
- All water less than the target will be reserved during the dry season to protect fish and wildlife

# Volume probability curve for flow deliveries over Gordy Road for dry seasons

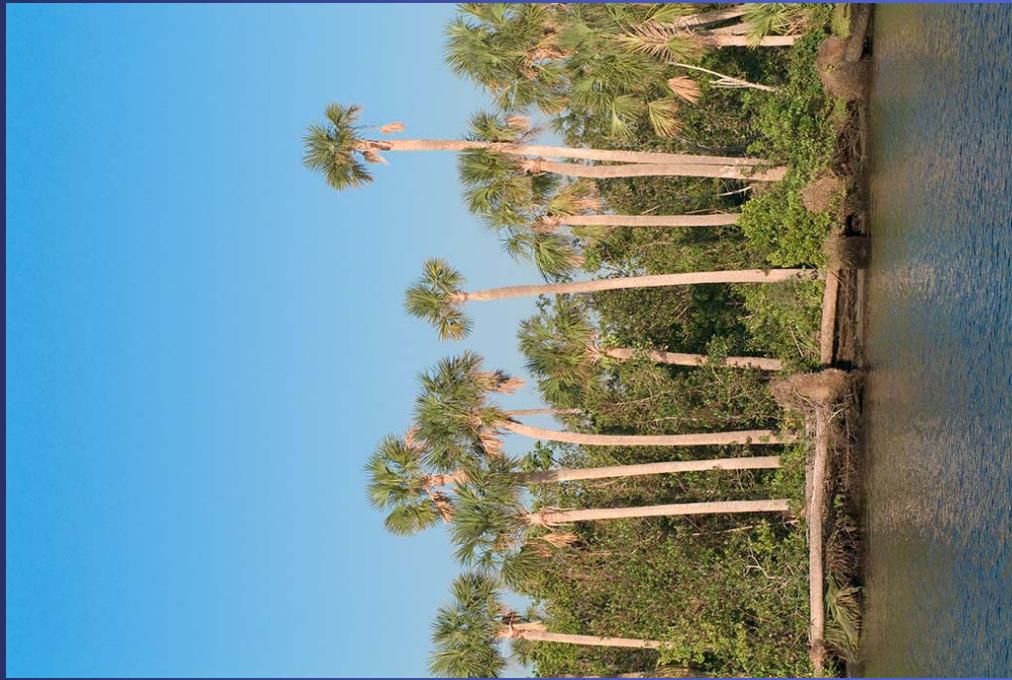


# volume probability curve of flow deliveries over the Gordy Road Structure to be reserved for the dry



# Presentation Overview

- Why and What are water reservations?
- Reservation for North Fork of St Lucie River
- Scientific Peer Review



[sfwmrd.gov](http://sfwmrd.gov)

# St Lucie Estuary Peer Review Schedule

- June 2 & 3: Peer Review Workshop conducted
- June 3 - June 20: Panel deliberations and public comment period through web conference board
- June 22: Peer review final report received

# Independent Scientific Peer Review

- What is reviewed?
  - *Technical Document to Support a Water Reservation Rule for the North Fork of the St. Lucie River, May 2009*
- What is scope of the review?
  - Determine if the proposed linkage between hydrology and water for fish and wildlife is scientifically sound
  - Determine, if the best available information is used in the analysis
  - All data, methods, models, assumptions subject to review

# Key Panel Recommendations

- Draft report ... “scientifically valid and uses currently accepted practices and concepts”
- Use of a Low Salinity Zone is suitable basis for guiding freshwater requirements
- The biological components are properly linked to the salinity
- 1 psu target is an ecologically defensible performance measure and is reinforced by literature on importance of low salinity zones to estuarine productivity

# Key Panel Recommendations, cont

- Include hydrologic details and predicted ecological benefits
- Clarify the open boundary condition in the hydrodynamic model
- Describe uncertainty associated with not including Floridan aquifer in watershed model and compare groundwater heads

# Key Panel Recommendations, cont

- Only meet flow target 90.5% of time.  
Describe the implications on biological resources
- Analysis provides a sound technical basis for reserving water to protect targeted fish and wildlife

# Major Milestones for Water Reservation Rule

- Initiated rule development: **April 2008**
- Completed draft technical report: **May 2009**
- Scientific peer review of scientific and technical data: **June 2 & 3, 2009**
- Rule Development workshops: **April through September 2009**
- Initiate rulemaking by seeking Governing Board approval to publish draft rule in Florida Administrative Weekly: **October 2009**

# Questions?



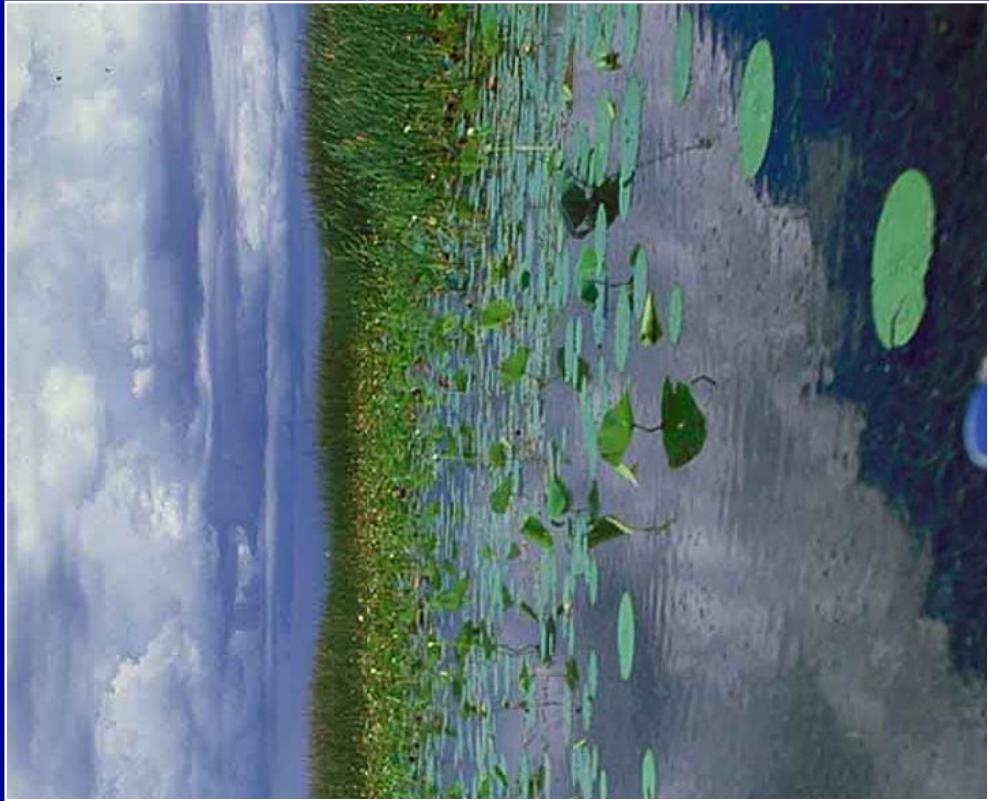
[sfwmrd.gov](http://sfwmrd.gov)

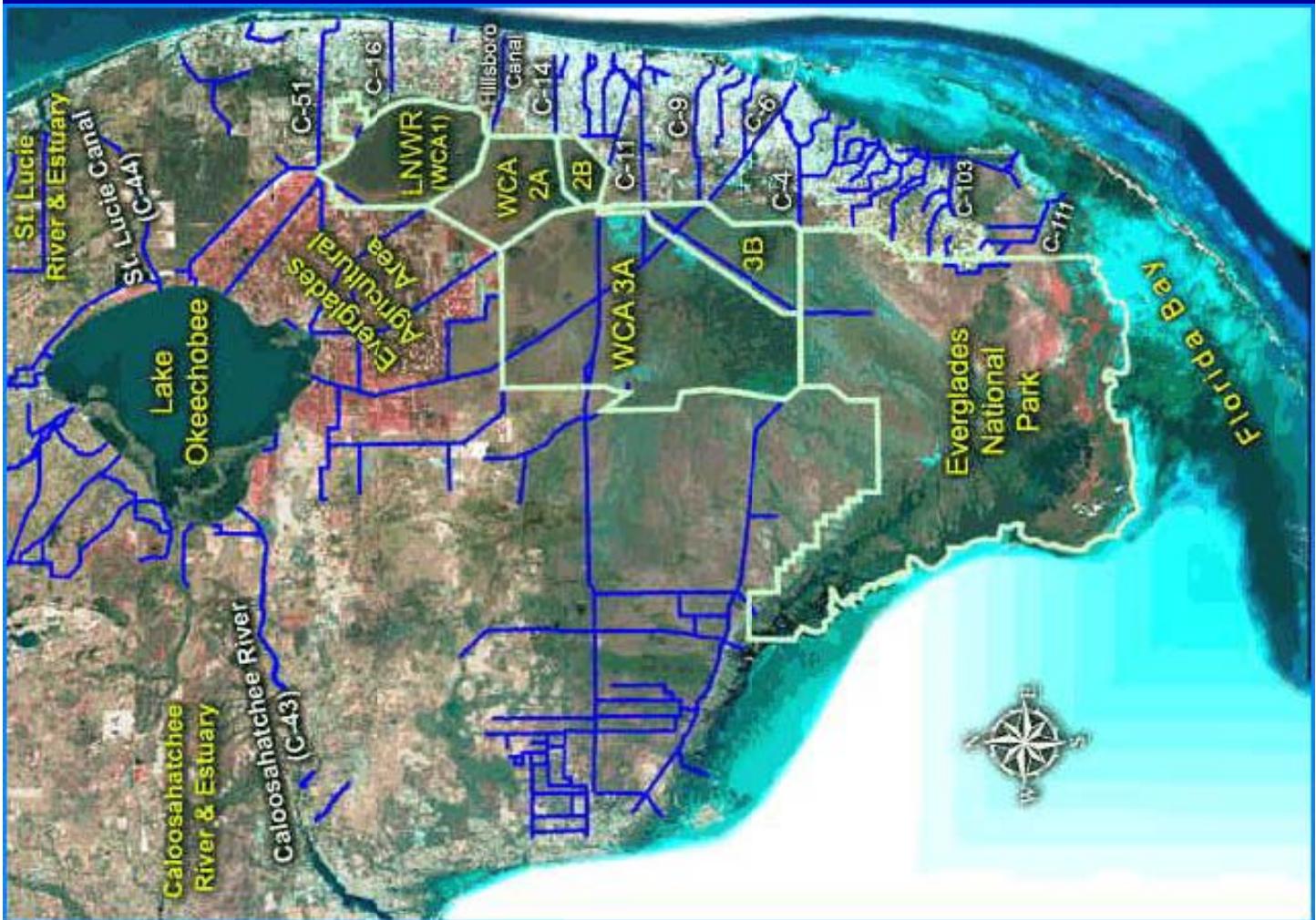
**Supporting documents for the following item have been added:  
Item #:13**

See supporting document: [Adaptive Protocols WSE WRAC  
update072009.pdf](#)

# Lake Okeechobee WSE Regulation Schedule & Adaptive Protocols

**Susan Gray, Ph.D.**  
Deputy Director  
Watershed Management Department



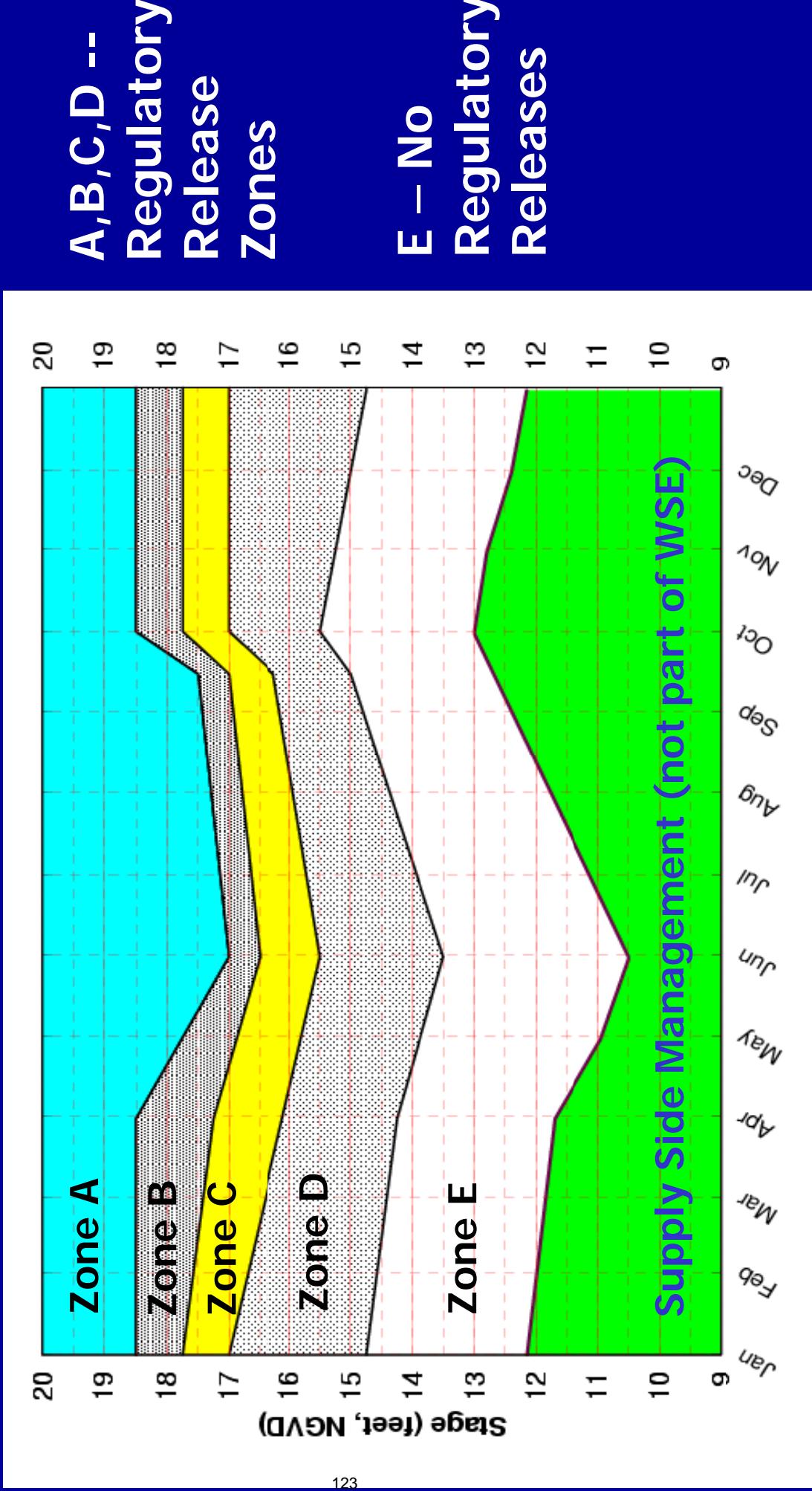


# Lake Okeechobee and the Regional Hydrologic System

# Lake Okeechobee Major Water Control Structures



# WSE Schedule



## **Adaptive Protocols were developed to:**

- Provide guidelines for determining specific volumes for regulatory discharges under the WSE Schedule
- Include procedures for making discharges to protect downstream ecosystems (e.g., salinity impacts in Caloosahatchee River)
- Occur in a highly transparent process with frequent venues for public input

Adaptive Protocols for WSE regulation schedule

## **Adaptive Protocols for WSE (Cont'd)**

- Include quantitative performance measures for environment and water supply
- Includes multiple feedback loops
- Provides ability to take advantage of opportunities
  - Is learning by doing (not a static process)

Adaptive Protocols for WSE regulation schedule

# Performance Measures

- Lake Okeechobee
- Caloosahatchee & St. Lucie Estuaries
- Agricultural and Urban Water Supply
- Everglades Protection Area
- Everglades Stormwater Treatment Areas

# Lake Okeechobee

- Protect SAV and emergent AV habitat
- Avoid extreme high stage (>17 ft)
- Avoid prolonged high (>15 ft,  $\geq 2$  months in summer,  $\geq 4$  months in winter)
- Avoid frequent extreme low stage (<11 ft)
- Attain a spring water level of 13.5 ft, with no stage reversals  $>0.5$  ft during winter-spring decline

# Caloosahatchee & St. Lucie Estuaries

- Protect oysters and SAV
- Maintain 300 to 2,800 cfs flow range for the CE
- Maintain 350 to 2,000 cfs flow range for the SLE
- Salinity  $< 10 \text{ \textperthousand}$  at Ft. Myers station in CE, measured as 30-day average
- If possible, pro-active lake releases early to reduce larger more harmful releases later

# Everglades Protection Area

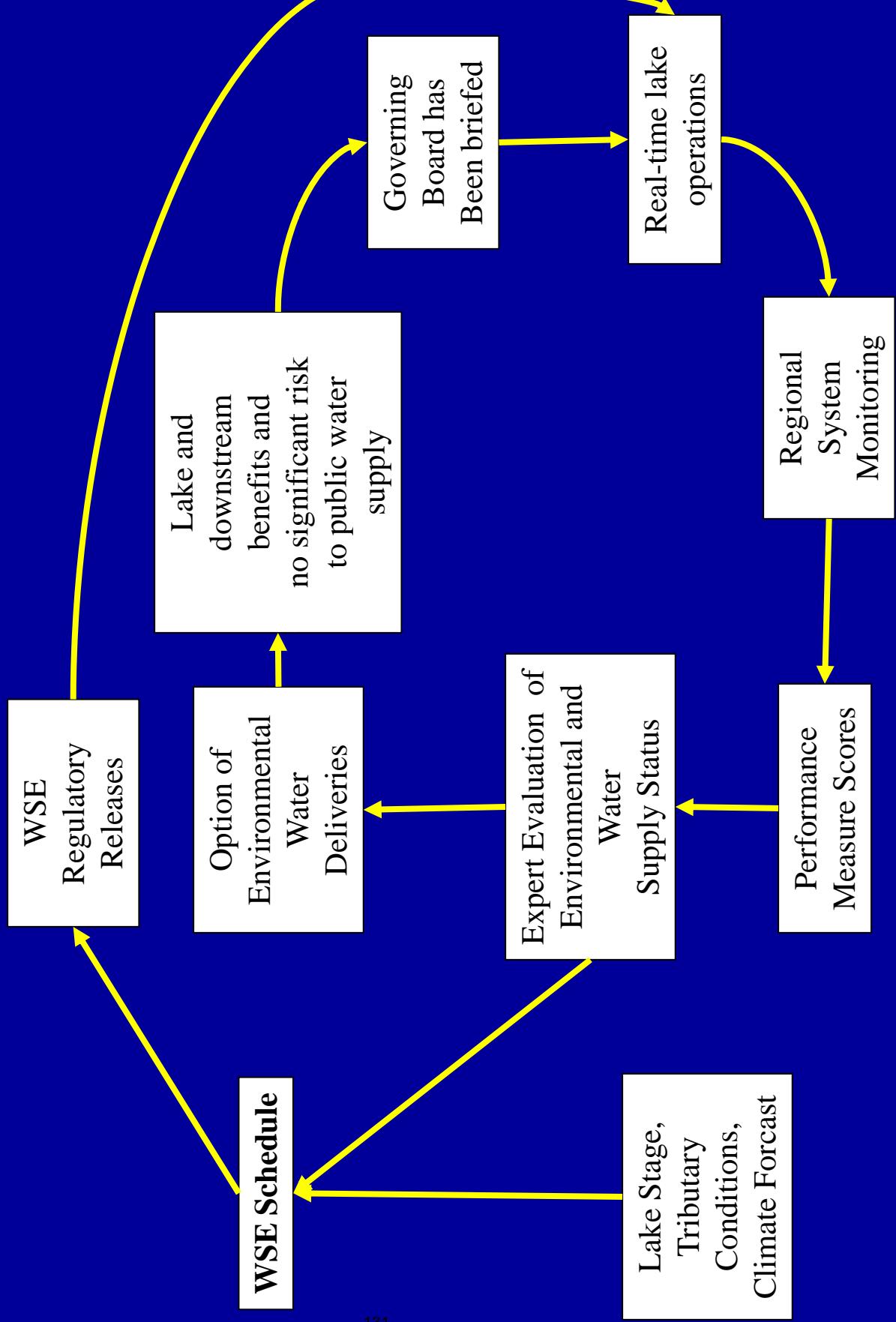
- Route lake water to best performing Stormwater Treatment Areas (STAs) to remove phosphorus
- Keep the STAs hydrated
- Avoid extreme high and low stages in Water Conservation Areas (WCAs)
- Facilitate WCA spring recession

Adaptive Protocols for WSE regulation schedule

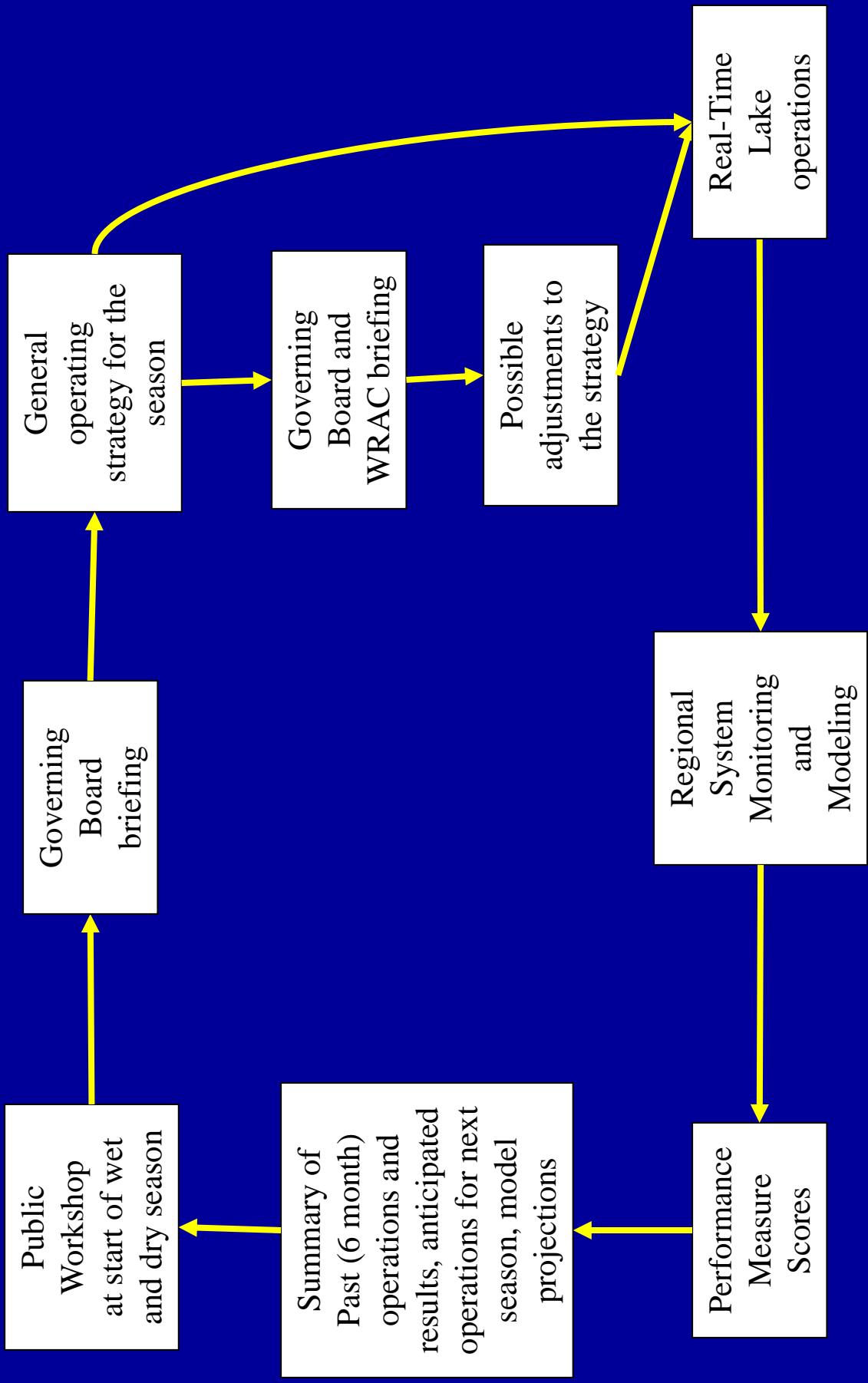
# Water Supply Performance Measures

- Projected Lake stage in next two months based on Position Analysis model
- Lake tributary hydrologic conditions based on Palmer Drought Index
- 1 and 3 month precipitation outlook from NOAA
- Lake net inflow multi-Seasonal forecast
- WCA stages

# Feedback Loop for Real-Time Operations



# Feedback Loop for Adaptive Protocols and WSE Public Process



# Adaptive Protocols Summary

- Identify specific discharge amounts in WSE
- Identify pro-active discharges in wet years
- Provide opportunities for Lake releases for resource protection
- Include frequent input from public
- Aim to maximize benefits to environment without increased risk to water supply

Adaptive Protocols for WSE regulation schedule

# WRAC Recommendations

(incorporated into the final protocols)

- protocols should include the option of making environmental water deliveries to downstream ecosystems, but not exceeding 300 cfs unless approved by the Governing Board, and only in Zone D or above*
- take advantage of opportunities where the WSE schedule calls for releases to the WCAs to provide freshwater to meet demands of the estuaries*

# Steps to Revising the Adaptive Protocols

- Incorporate existing protocols into the LORS 2008 regulation schedule
- Update performance measures, and modeling as necessary, for evaluating performance of the revised protocols
- Work with WRAC sub-committee to identify additional areas for improvement
- Present to Governing Board for acceptance
- Use to guide weekly recommendation for system operations as well as Governing Board guidance to the USACE.